



Competency based Curriculum

LANDSCAPE TECHNOLOGY

Diploma



མཁའ་འགྲུབ་
ཞེས་རིག



Technical Trainers Training and Resource Centre
Department of Workforce Planning and Skills Development
Ministry of Education and Skills Development

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དཔལ་ལྷན་འབྲུག་གཞུང་། ཤེས་རིག་དང་རིག་ཆུང་གོང་འཕེལ་ལྷན་ཁག།
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Royal Government of Bhutan
Ministry of Education and Skills Development
Department of Workforce Planning and Skills
Development



Certificate No: DWPSD/CEC-LT/2025-26/017

Curriculum Endorsement Certificate

This is to certify that the curriculum for the following course(s) developed by

Technical Trainers Training and Resource Center

has been endorsed by the department.

Course	Level
Landscape Technology	Diploma



Date of Endorsement: 29/05/2026

This certificate is valid till 28/05/2031 from the date of endorsement.

Director General
Department of Workforce Planning and Skills Development

Foreword

Bhutan has seen a gradual increase in the requirement of skilled workers in recent years due to the growth of industries. However, the supply of skilled workforce that is responsive to the needs of the industry has not been able to keep pace with industry demand. Since skilled workers are a crucial ingredient for the socio-economic development of the country, it is important to have an adequate number of trained and certified workers. With growing industries, the “Landscape Technologist” is not only a significant occupation but also in high demand in the labour market. In an effort to meet the skilled human resources requirement, it is imperative to deliver training based on the Competency Based Training system in Landscape Technology Diploma to ensure a quality and adequate workforce in this sector.

To this end, the Department of Workforce Planning and Skills Development (DWPSD) is pleased to present the first edition of the Competency Based Curriculum for the Landscape Technology Diploma course, developed with technical support from Humber Polytechnic, Canada and with funding from Global Affairs Canada (GAC) through the Bhutan Education and Skills Training (BEST) Project. Since it is an outcome of a more participatory process of curriculum development, it is expected to provide training delivery with reformed approaches, with its content being directly related to labour market needs, focusing on imparting skills and assessment based on industry work standards. We believe that the Competency Based Curriculum will help bridge the skill gap between industry needs and training institutes, thereby enhancing the employability of technical graduates.

The Department acknowledges the valuable contributions made by institutes and experts from relevant industries who were involved in the design and development of this curriculum. As it is a dynamic document that may require revision based on the needs of the changing labour market, the Department looks forward to receiving valuable feedback from institutes and industries to further improve and refine the curriculum. The Department hopes that this document will help advance Competency Based Learning in most of the TVET institutions.

A handwritten signature in blue ink, appearing to read 'Phub Rinzin', is written over a light blue rectangular background.

(Phub Rinzin)

Director General

Department of Workforce Planning and Skills Development

Acknowledgement

Technical Trainers Training and Resource Center, Department of Workforce Planning and Skills Development would like to express our appreciation to Humber College for sharing curriculum material and the following subject experts and facilitator who have participated in the development and validation of curriculum for Landscape Technology Diploma:

Experts involved in curriculum development of Landscape Technology:

1. Mr. Karma Sonam, Program Director, Rural Development Training Center
2. Mr. Tenzin Chophel, Sr. Horticulture supervisor, Dechencholing Royal Project
3. Ms. Tshering Wangmo, Biodiversity Technician, National Biodiversity of Bhutan
4. Mr. Sonam Norbu, Assistant Lecturer, Rural Development Training Center
5. Mr. Tshering Peljor, Senior Bio-Aesthetic Officer, Gyalsung Infra
6. Mr. Tek Bdr Bhandari, Assistant Instructor, Jigme Wangchuck Power Training Institute
7. Mr. Suraj, Bhattarai, Druk Heritage Architecture

Experts involved in curriculum validation of Landscape Technology:

1. Ms. Deborah Males, Landscape Architect, Green Bhutan Corporation Ltd. (**Chair Person**)
2. Ms. Karma Minjur Selden, Architect, Gyalsung/Zhabtoha Infra
3. Ms. Lenmith Lepcha, Head, Nursery Plantation and Floriculture Section, Green Bhutan Corporation Ltd.
4. Mr. Kezang Tobgay, Biodiversity Officer, National Biodiversity Centre
5. Ms. Melam Zangmo, Founder, Kith-Tshel Garden, Thimphu
6. Mr. Karma Sonam, Program Director, Rural Development Training Center
7. Mr. Karma Tamang, Instructor, Rural Development Training Center

Facilitators and editors for curriculum development and validation of Landscape Technology:

1. Ms. Karma Dema, Program Officer, TTTRC, DWPSD

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Course Outline for Landscape Technology Diploma

Sl. No	Subject /Module	Duration (Hours)	Content Competencies (Mapped)
1.	Core modules	1749	CC
2.	OJT	420	CC
3.	Project work	140	
4.	Self-study	140	
5.	Summative and formative assessment	180	
Total		2629	
Generic Modules			
6.	Applied Dzongkha	42	SS
7.	Applied ICT	90	SS
8.	Applied Mathematics	126	SS
9.	Professional English Language	136	SS
10.	Ethics and integrity	68	PD
11.	GNH and Human Values module	30	PD
Total		492	
Total Course Duration (Core Modules +OJT + Generic Modules)		2661	

Note: (*) This curriculum contains core modules which cover main competencies of Landscape Technology Diploma and OJT components. There are separate curricula for subjects/modules for delivery of soft skills, professional development & values and environmental concern & safety. In order to achieve the qualification of Landscape Technology Diploma, the subjects and modules listed must be accomplished as per the credit hours provided.

Content Competencies:

CC-Core Competencies

SS-Soft Skills

PD-Professional Development and Values

Course Structure (2 Years Program)

1. Semester 1

SL. No		Duration (Hours)
1.	Module 1	492
2.	Ethics and integrity	68
3.	Applied Dzongkha	42
4.	Professional English Language	68
5.	Institute Assessment	30
Total Duration:		700

2. Semester 2

SL. No	Subject/Module	Duration (Hours)
1.	Module 2	614
2.	GNH and Human Values	30
3.	Applied ICT	90
4.	Institute Assessment	30
Total Duration		764

3. Semester 3

SL. No	Subject/Module	Duration (Hours)
1.	Module 3 LO1	24
2.	Module 3 LO3	183
3.	Module 3 LO4	21
4.	OJT	420
5.	Institute Assessment	30
Total Duration:		678

4. Semester 4

SL. No	Subject/Module	Duration (Hours)
1.	Module 3 LO2	284
2.	Module 4	131
3.	Applied Mathematics	126
4.	Professional English Language	68
5.	Institute Assessment	30
6.	Annual Assessment	60
Total Duration:		699

COMPETENCY PROFILE

Occupation: Landscape Technologist

Level: Diploma

Competency Area	Sub- Competency Area	Competencies/Tasks			
A: Carry out ornamental plant operations	A1: Perform plant identification	A1.01 Identify common ornamental trees	A1.02 Identify common ornamental shrubs	A1.03 Identify common ornamental herbs	A1.04 Identify common ornamental climbers/vines
		A1.05 Identify common ornamental ferns and grasses	A1.06 Maintain Herbarium specimen		
	A2: Perform nursery management	A2.01 Construct green house	A2.02 Prepare growing media	A2.03 Perform seedling care	
	A3: Perform plant propagation	A3.01 Perform seed propagation	A3.02 Perform air layering	A3.03 Perform cutting	A3.04 Perform grafting
		A3.05 Perform budding	A3.06 Perform plant division		
	A4: Perform plant health management	A4.01 Identify common pests, diseases and weeds	A4.02 Manage pests	A4.03 Manage diseases	A4.04 Manage weeds
		A4.05 Perform plant nutrient management	A4.06 Perform pruning and training		
B: Plan and Design Landscape Projects	B1: Analyse Site Conditions and Requirements	B1.01 Prepare basic site map	B1.02 Conduct site survey	B1.03 Conduct Initial Environment Examination (IEE)	B1.04 Conduct environmental risk assessment
		B1.05 Prepare preliminary site analysis report			

	B2: Prepare landscape design concept	B2.01 Prepare hand sketch	B2.02 Develop design concept based on site analysis	B2.03 Prepare basic landscape concept design	B2.04 Present design concept
	B3: Prepare 2D design and specifications	B3.01 Identify tools and features of 2D CAD programming	B3.02 Perform basic 2D CAD operations	B3.03 Prepare detailed landscape design in 2D	B3.04 Prepare specifications and schedules
		B3.05 Prepare estimation and costing			
	B4: Prepare 3D design	B4.01 Identify tools and features of 3D CAD programming	B4.02 Perform basic 3D CAD operations	B4.03 Prepare landscape design in 3D	B4.04 Perform rendering
C: Manage Landscape Development Works	C1: Prepare Landscape Development works	C1.01 Prepare operational workplan	C1.02 Manage resources	C1.03 Maintain inventory of resources	C1.04
	C2: Install hardscape	C2.01 Perform site preparation	C2.02 Install drainage systems	C2.03 Construct retaining wall	C2.04 Install walkways
		C2.05 Install deck	C2.06 Install irrigation systems	C2.07 Construct gazebo	
	C3: Install softscape	C3.01 Prepare plantation site	C3.02 Perform plantation	C3.03 Perform root balling	C3.04 Develop lawn
	C4: Supervise landscape development work	C4.01 Supervise daily work	C4.02 Inspect work quality and quantity	C4.03 Maintain progress report	
D: Manage maintenance of landscape works	D1: Perform maintenance of hardscape	D1.01 Prepare for maintenance work	D1.02 Prepare estimation and costing	D1.03 Perform maintenance	
	D2: Perform maintenance of softscape	D3.01 Prepare estimation and costing	D3.02 Perform plant maintenance	D3.03 Perform soil maintenance	D3.04 Perform lawn maintenance
	D3: Manage irrigation and water efficiency system	D4.01 Monitor irrigation system	D4.02 Implement water efficient irrigation practices	D4.03 Conduct periodic maintenance of irrigation system	

Course Information

COURSE TITLE	Landscape Technology
LEVEL	Diploma
COURSE OBJECTIVE	Upon completion of Landscape Technology Diploma, the trainee will be able to: ● Carry out ornamental plant operations ● Plan and design landscape projects ● Manage landscape development works ● Manage maintenance of landscape works
COURSE DESCRIPTION	This course is designed to provide learners the knowledge, skills and attitude to become competent landscape technologist in accordance with industry standards. Upon completion of this course, the graduates will be able to work in industries where they can perform duties like ornamental plant operations, plan, design and landscape works. To obtain the qualification of Landscape Technologist, all learning outcomes prescribed for this qualification must be achieved.
TOTAL DURATION	2661 Hours
TRAINING PROPORTION	1:12 (Practical) 1:20 (Theory)
ENTRY REQUIREMENT	● Completed class XII (PCA) but have to undergo bridging course ● Completed BQF Certificate 3 in relevant courses ● Preference will be given to Landscape Technician BQF C3 graduates
TRAINER QUALIFICATION	● Must have a minimum qualification of degree in a relevant field; ● Must have undergone Training of Trainers-Technical Instruction and Pedagogy; ● Must have at least 5 years job/industry experience in relevant field if institute hire instructors or guest lecturers from industry.

Assessment and Certification System

ASSESSMENT	Formative assessment for every module and learning outcome will be conducted through assignments, project works, continuous assessment, demonstration of practical skills/observations, oral questioning and written test. Summative assessment after completion of each national certificate level will be conducted by Bhutan Qualification and Professional Certificate Authority (BQPCA), MoESD as per the National Competency Standards and Guidelines for National Assessment and Certification System, provided the course is accredited with BQPCA, MoESD.
CERTIFICATION	On successful completion of course, the institute will award a certificate of achievement to the trainees. The Bhutan Qualification and Professional Certificate Authority (BQPCA), MoESD will award a National Diploma Certificate to the trainees upon the successful completion of each ND level assessment.
COURSE DELIVERY	1. Modular 2. Demonstration 3. Lecture 4. Discussion with problem-based learning 5. Industrial training/attachment 6. Project work
RESOURCES	Materials Pens, pencils, notebooks, files, nursery journals, stock registers, attendance sheets, reports, operational plans, reference charts, drawing and rate analysis manuals, review checklists, IEE checklists/forms, risk assessment forms/checklists, clipboards, drawing sheets, sketch books, graph paper, tracing paper, scales, labels, plant tags, name tags, markers, marker pens, masking tape, color pencils/watercolors, sketch pens, inking pens, erasers, sharpeners, sample collection bags, old newspapers, Ziploc bags, ethanol, glycerin, silica gel, naphthalene, misting bottles, greenhouse sets, shade nets, green nets, wooden layout pegs, pegs, twine, ropes, jute ropes, mason threads, chalk lines, hessian cloth, fencing poles, poly pots, seedling trays, seedlings, stacking sticks, polythene sheets, seeds, planting materials, sod, lawn grass seeds, sample trees, shrubs, plants, growing media, potting media, soilless media, sphagnum moss, coco peat, soil, topsoil, sand, aggregates, gravels, compost/leaf mould, organic manure, mulch, perlite, soil amendments, lime, water, fertilizers, synthetic fertilizers, chemical fertilizers, organic and chemical formulations, growth hormones, rooting hormones, fungicides, herbicides, pesticides, lab consumables, grafting tape, budding tape, candle wax, PVC/HDPE pipes, pipe fittings, perforated pipes, drip lines, sprinkler sets, low-flow sprinkler heads, nozzles, gate valves, jointing unions, threading tape, thread tape, jointing glue, water tanks, geotextile fabric/membrane, bedding materials, bricks, stones, cement, concrete sealers, waterproof coatings, pavers,

paver sealants, tiles, timber, planks, battens, MS rods, roofing materials, nails, wires, sockets, bulbs, anti-corrosion paint, adhesives, sanding paper, and support stakes.

Tools

Magnifying lens, tweezers, forceps, soft brushes, mounting sheets, herbarium press, display case, monitor lights, insect trap net, light traps, sticky traps, measuring tape, laser tape measure, scale ruler, compass, drawing board, adjustable set-square, T-square, scientific calculator, calculator, weighing balance, weighing container, measuring can, pressure gauge, soil moisture meter, flow meter, soil auger, soil sieve, sieve, spade, shovel, hoe, rake, pickaxe, crowbar, sickle, hand trowel, secateur, pruners, hedge shears, pruning saw, grafting and budding knife, knife, scissors, ladder, sharpening stone, wheelbarrow, bucket, bowl, watering can, watering pipe, pipe, spray bottle, hand sprayer, knapsack sprayer, duster, fertilizer spreader, aerator sandals, hammer, rubber mallet, dressing hammer, pliers, pipe wrench, wrench set, screwdriver, hacksaw, pipe cutter, heating plate, spirit level, water level pipe, plumb bob, pegs, jute rope, try square, concrete trowel/float, masonry trowel, masonry chisel, straightedge, screed bar, block splitter, mortar pan, mixing tray, motor pan, brush, broom, basic masonry tools, basic carpentry tools, and soil compactor.

Application/Software

Plant identification application, AutoCAD, Microsoft Excel, spreadsheet software, project management software, 3D modelling software, and rendering software.

Equipment

Camera with high-resolution lens, GPS, scanner, computer, microscope, smartboard, projector, cool box, refrigerator, rapid soil testing kit, hand drilling machine, cordless drill, chainsaw, cordless shear, hedge trimmer, brush cutter, grass cutter, line trimmer, mini tiller, soil tiller, soil auger, lawn mower, lawn blower, lawn roller, fertilizer spreader, excavation equipment, laser level, water pump, soil compactor, stone cutter, angle grinder, wood planer, and irrigation controller.

PPE

Workshop dress, safety boots, safety gloves, safety goggles, safety helmet, safety mask, ear plug, rain gears and hand sanitizer

Learning Materials

- Competency Based Learning Materials (CBLM)
- Reference books
- Hand-outs
- Audio visuals

Infrastructure and training facilities

- ***Theory classroom size:*** Minimum of 1.5 m² per trainee;
- ***Practical Workshop size:*** Minimum of 3 m² per trainee. Variables must be considered depending upon type of skills being taught and the number of trainees participating at a time.

**Module Information:
Landscape Technology Diploma**

Module 1
on
Carrying out ornamental plant operations

MODULE INFORMATION

Occupation	Landscape Technologist
Competency Area	Carry out ornamental plant operations
Module Title	Carrying out ornamental plant operations
Module Code	2512-L4-M1
Module Description	This module is structured to provide learners the knowledge, skills and right attitude required to perform plant identification, nursery management, plant propagation and plant health management.
Nominal Duration	492 Hours
Qualification	Diploma
Pre-requisite	● Completed class XII (PCA) but have to undergo bridging course ● Completed BQF Certificate 3 in relevant courses ● Preference will be given to Landscape Technician BQF C3 graduates
Learning Outcome	1. Perform plant identification 2. Perform nursery management 3. Perform plant propagation 4. Perform plant health management

Module Title	Carrying out ornamental plant operations		
Module Code	2512- L4-M1		
Learning Outcome 1	Perform plant identification		
Duration	Theory:124 hours	Practical:95 hours	Total: 219 hours
Assessment Criteria	• Common ornamental trees are identified as per the standard procedure • Common ornamental shrubs are identified as per the standard procedure • Common ornamental herbs are identified as per the standard procedure • Common ornamental climbers/vines are identified as per the standard procedure • Common ornamental ferns/grasses are identified as per the standard procedure • Herbarium are maintained as per the standard procedure		
Content	A1.00 Introductory knowledge • Introduction to Landscape Technology • Market trends of landscape technologist A1.01 Identifying common ornamental trees Knowledge • Introduction to botany • Basic plant taxonomy • Basic plant terminology • Basic plant morphology • Basic plant ecology • Basic Plant physiology • Key characteristics of ornamental trees • Types of common ornamental trees • Uses of common ornamental trees • Native and exotic plants • Difference between indoor and outdoor plants Skills • Using GPS • Operating camera • Using mobile application • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Encouraging inclusive participation • Ensuring to follow OHS rules and regulation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste		

	A1.02 Identifying common ornamental shrubs <i>Knowledge</i> • Key characteristics of ornamental shrubs • Types of common ornamental shrubs • Uses of common ornamental shrubs <i>Skills</i> • Using GPS • Operating Camera • Using mobile app • Observation skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Encouraging inclusive participation • Efficient use of resources • Ensuring to follow OHS rules and regulation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste A1.03 Identifying common ornamental herbs <i>Knowledge</i> • Key characteristics of ornamental herbs • Types of common ornamental herbs • Uses of common ornamental herbs <i>Skills</i> • Using GPS • Operating Camera • Using mobile app • Observation skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring to follow OHS rules and regulation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste
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	A1.04 Identifying common ornamental climbers/vine <i>Knowledge</i> • Key characteristics of ornamental climber • Types of common ornamental climber • Uses of ornamental climbers <i>Skills</i> • Using GPS • Operating Camera • Using Mobile app • Observation skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring to follow OHS rules and regulation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste A1.05 Identifying common ornamental ferns and grasses <i>Knowledge</i> • Key characteristics of ornamental ferns and grasses • Types of common ornamental ferns and grasses • Uses of ornamental ferns and grasses <i>Skills</i> • Using GPS • Operating Camera • Using mobile app • Observation skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring to follow OHS rules and regulation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste
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	A1.06 Maintaining Herbarium specimen Knowledge • Introduction to basic herbarium • Purpose of maintaining herbarium • Labelling details required while maintaining herbarium Skills • Plant identification skills • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring to follow OHS rules and regulation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring proper care of herbarium for future use • Ensuring appropriate labelling on herbarium
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference materials • Hand-outs • Audio Visuals • Reference books-<i>Flora of Bhutan/Plant of the World Online (PoWO)</i> • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, pins, adhesives, ethanol, silica gel, naphthalene, Ziploc, misting bottle, old newspaper and glycerin Tools • Magnifying lens, tweezer, soft brushes, mounting sheets, monitor lights, magnifying lens, herbarium press and display case Application • Plant identification application Equipment • Camera with high resolution lens, GPS, scanner, computer and microscope

	PPE • Workshop dress, safety boots, safety gloves, rain gears and hand sanitizer
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out ornamental plant operations		
Module Code	2512-L4-M1		
Learning Outcome 2	Perform nursery management		
Duration	Theory: 24 hours	Practical:46 hours	Total: 70 hours
Assessment Criteria	- Green house is constructed as per the standard procedure - Growing media is prepared as per the standard procedure - Seedling care is performed as per the standard procedure		
Content	A2.01 Constructing Green house Knowledge - Definition of greenhouse - Function of greenhouse - Types of greenhouse - Working principle of greenhouse - Types of greenhouse materials - Method of layout - Criteria for greenhouse site selection - Concept of greenhouse gas emission - Definition of shade house - Function of shade house - Types of shade house Skills - Interpreting drawing and manual - Basic carpentry skills - Operating drilling machine - Analytical skills - Observation skills - Planning skills Attitude, safety and environmental concern - Effective time management - Being team player - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment - Ensuring inclusive participation - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensuring to follow OHS rules and regulation A2.02 Preparing growing media Knowledge - Introduction to growing media - Process of sterilizing growing media		

	• Methods of soil sterilization • Process of media nutrient availability test • Components of growing media • Standard mixing ratios • Characteristics of good growing media (<i>porosity – drainage and aeration, moisture retention, organic matter, C:N ratio, CEC, pH</i>) • Basic native soil properties (<i>structure, texture, density, porosity, chemistry, soil colour</i>) • Importance of clean media and hygiene • Common contaminants (weeds, pests, diseases) • Sustainable soil management Skills • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulation • Ensuring proper disposal of waste A2.03 Performing seedling care Knowledge • Methods of nurturing different types of plants • Procedure of seedling hardening • Techniques of seedling pinching and transplanting (pricking) Skills • Using knapsack sprayer • Using secateurs • Using scissors • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
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Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books-<i>Flora of Bhutan/Plant of the World Online (PoWO)</i> • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, note book, greenhouse set, shade net, wooden layout peg, twine, soil, sand, compost/leafmould, perlite coco peat, water, fertilizer, growth hormone, fungicide, nursery journal, poly pots, name tag, seeding trays, seedling and stacking sticks Tools • Measuring tape, spade, shovel, hammer, pliers, crowbar, hacksaw, knife, wrenches, screwdriver, sickle, wheel barrow, weighing container, bucket, sieve, watering can, pipe, knapsack sprayer, hoes, light & sticky traps and secateur Equipment • Hand drilling machine PPE • Workshop dress, helmet, safety boot, safety gloves and rain gear
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out ornamental plant operations		
Module Code	2512-L4-M1		
Learning Outcome 3	Perform plant propagation		
Duration	Theory:23 hours	Theory:47 hours	Theory:70 hours
Assessment Criteria	- Seed propagation is performed as per the standard procedure - Layering is performed as per the standard procedure - Cutting is performed as per the standard procedure - Grafting is performed as per the standard procedure - Budding is performed as per the standard procedure - Plant division is performed as per the standard procedure		
Content	A3.01 Performing seed propagation Knowledge - Introduction to plant propagation - Methods of propagation - Introduction to seed propagation - Methods of seed collection and storage - Methods of seed treatment - Seed collection timing - Propagation season - Environment conditions for seed propagation Skills - Observation skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Proper handling of seed - Effective time management - Having integrity and work ethics - Efficient use of resources - Encouraging inclusive participation - Ensuring to follow OHS rules and regulation - Ensuring appropriate use of PPE - Ensuring proper disposal of waste A3.02 Performing layering propagation Knowledge - Basic wood anatomy - Introduction to layering methods: simple layering, tip layering, compound (serpentine) layering, mound (stool) layering, air layering, trench layering and natural forms of layering in plants - Advantages and disadvantages of air layering - Conditions required for air layering - Types of rooting hormone - Purpose of using rooting hormone		

	<i>Skills</i> ● Using budding and grafting knife ● Using secateur ● Observation skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A3.03 Performing cutting <i>Knowledge</i> ● Basics of plant physiology ● Introduction to cutting ● Types of cutting ● Conditions required for cutting ● Advantages and disadvantages of cutting <i>Skills</i> ● Using secateurs ● Using budding and grafting knife ● Observation skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A3.04 Performing grafting <i>Knowledge</i> ● Basics of plant physiology ● Introduction to grafting ● Conditions required for grafting ● Types of grafting ● Advantages and disadvantages of grafting
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	<i>Skills</i> ● Using grafting knife ● Using secateur ● Observation skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A3.05 Performing budding <i>Knowledge</i> ● Basics of plant physiology ● Introduction to budding ● Conditions required for budding ● Types of budding ● Advantages and disadvantages of budding <i>Skills</i> ● Using budding knife ● Using secateur ● Observation skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A3.06 Performing plant division <i>Knowledge</i> ● Types of plants suitable for division (clumps, rhizomes, tubers, bulbs, crowns) ● Purpose of plant division ● Conditions required for plant division ● Advantages and disadvantages of plant division ● Introduction to tissue culture
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	Skills ● Observation skills ● Planning skills ● Analytical skills Attitude, safety and environmental concern ● Proper handling of tools, materials and equipment ● Having work ethics and integrity ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials ● Competency Based Learning Materials (CBLM)/Reference material ● Hand-outs ● Audio Visuals ● Reference books-<i>Flora of Bhutan/Plant of the World Online (PoWO)</i> ● Manuals Learning facilities and infrastructure ● Classroom with adequate facilities ● Information Technology (IT) lab ● Library ● Workshop Materials ● Pen, pencil, notebook, poly pot, polythene sheet, seeds, fungicide, growing media, sample tree/shrubs, plants, sphagnum moss/cocopeat, plastic wrapping bag, twine, rooting hormone, potting media, grafting tape, candle wax, ethanol and budding tape, hessian cloth, jute rope, fungicide and plant tag Tools ● Rake, watering pipe, wheel barrow, seed tray, knife, shovel, spade, bowl, watering can, pruning saw, grafting & budding knife, secateur, crowbar, spray bottle, pickaxe, hand trowel and hoe Equipment ● Cool box and refrigerator PPE ● Workshop dress, safety boots, safety gloves and rain gears

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Carrying out ornamental plant operations		
Module Code	2512-L4-M1		
Learning Outcome 4	Perform plant health management		
Duration	Theory: 74 hours	Practical: 59 hours	Total: 133 hours
Assessment Criteria	● Pest, disease and weeds are identified as per standard procedure ● Pest is managed as per standard procedure ● Disease is managed as per standard procedure ● Weeds are managed as per standard procedure ● Nutrient management is performed as per standard procedure ● Pruning and thinning is performed as per standard procedure		
Content	A4.01 Identifying pest, disease and weeds Knowledge ● Introduction to plant care ● Methods of plant health management ● Introduction to Integrated plant health and weed management practices ● Basic Plant pathology ● Basic plant entomology ● Basic weed science Skills ● Operating camera ● Using microscope ● Interpreting chart ● Analytical skills ● Observation skills ● Planning skills Attitude, safety and environmental concern ● Being vigilant and patient ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring to follow OHS rules and regulation ● Ensuring appropriate use of PPE A4.02 Managing pest Knowledge ● Basics of plant entomology ● Basics of integrated plant pest management ● Methods of sustainable pest management and its application ● Safety precautions while using pesticides ● Acts and rules related to pest and pesticides Skills ● Using microscope ● Operating camera ● Observation skills		

	● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A4.03 Managing diseases <i>Knowledge</i> ● Basics of plant pathology ● Basics of integrated plant disease management ● Types of sustainable integrated plant disease management and its application <i>Skills</i> ● Using microscope ● Operating camera ● Observation skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A4.04 Managing weeds <i>Knowledge</i> ● Basics of weed science ● Type of weeds ● Weed control measures ● Safety precautions while using herbicides ● Importance of safe disposal of invasive, non-native and noxious plant material <i>Skills</i> ● Operating camera ● Using knapsack sprayer ● Observation skills ● Analytical skills
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	● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A4.05 Performing plant nutrient management <i>Knowledge</i> ● Basics of soil science ● Components of native soil profile ● Importance of interrelationships between soil, fungi, plants and animals ● Basic of soil fertility and plant nutrient management ● Plant nutrient formulation ● Sustainable soil management and its application <i>Skills</i> ● Using rapid soil testing kits ● Observation skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Proper handling of tools & equipment ● Effective time management ● Having integrity and work ethics ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation A4.06 Performing pruning and training <i>Knowledge</i> ● Importance of pruning and training ● Sustainable methods of plant health management ● Types of pruning and training techniques ● Season for pruning and training <i>Skills</i> ● Using chain saw ● Using hedge trimmer ● Using secateur/pruners /loppers ● Using cordless shear ● Observation skills ● Analytical skills
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	● Planning skills Attitude, safety and environmental concern ● Proper handling of tools, materials and equipment ● Effective time management ● Having work ethics and integrity ● Efficient use of resources ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials ● Competency Based Learning Materials (CBLM)/Reference material ● Hand-outs ● Audio Visuals ● Reference books-<i>Flora of Bhutan/Plant of the World Online (PoWO)</i> ● Manuals Learning facilities and infrastructure ● Classroom with adequate facilities ● Information Technology (IT) lab ● Library ● Workshop Materials ● Pen, pencil, notebook, file, reference chart, sample collection bag, plant tag, labels, markers, organic & chemical formulation, lab consumables, herbicide, chemical fertilizer, soil amendment and rope Tools ● Magnifying lens, forceps, scissors, insect trap net, secateur, knapsack sprayer, hand sprayer, duster, bucket, measuring can, weighing balance, wheel barrow, spade, shovel, hoe, soil auger, hedge shears, pruners, pruning saw, ladder, sharpening stone and knife Equipment ● Microscope, camera, rapid soil testing kit, chainsaw, cordless shear and hedge trimmer PPE ● Workshop dress, safety boots, safety gloves and rain gears
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: ● Lecture ● Interactive discussion ● Demonstration ● Industrial visit/training ● Guided practice ● Group practice with project-based learning ● Individual practice with problem-based learning

	• Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module 2
on
Planning and Designing Landscape Project

MODULE INFORMATION

Occupation	Landscape Technologist
Competency Area	Plan and design landscape project
Module Title	Planning and designing of landscape project
Module Code	2512-L4-M2
Module Description	This module is structured to provide learners with the knowledge, skills and right attitude required to analyse site conditions & requirements, prepare landscape design concept and sketches.
Nominal Duration	614 Hours
Certificate level/Qualification	Diploma
Pre-requisite	Completed module 2512-L4-M1
Learning Outcome	1.Analyse site conditions and requirements 2.Prepare landscape design concept 3.Prepare 2D design 4.Prepare 3D design and specifications

Module Title	Planning and designing of landscape projects		
Module Code	2512-L4-M2		
Learning Outcome 1	Analyse site conditions and requirements		
Duration	Theory: 23 hours	Practical:44 hours	Total: 67 hours
Assessment Criteria	• Basic site map is prepared as per the standard procedure • Site survey is conducted as per the standard procedure • Initial Environment-Examination is conducted as per standard procedure • Environmental risk assessment is conducted as per the standard procedure • Preliminary site analysis report is prepared as per the standard procedure		
Content	B1.01 Preparing basic site map Knowledge • Purpose of site maps in landscaping • Basic principles of site mapping • Basic landscape symbols and drawings • Use of scale • Basic measurement techniques • Importance of reading site survey data • Introduction to orientation and north direction Skills • Using GPS • Measurement skills • Observation skills • Sketching and drawing skills • Analytical skills • Planning skills Attitude, safety and environment concern • Attention to detail • Proper handling of tools and materials • Effective time management • Having work ethics and integrity • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring to use accurate measuring tools • Ensuring to maintain accuracy and neatness • Ensuring to follow OHS rules and regulation B1.02 Conducting site survey Knowledge • Purpose of site survey • Basic site survey principles • Basic land measurement techniques • Basic soil types and drainage • Basic topographical concepts • Basic environmental factors in landscaping		

	Skills ● Using GPS ● Using mobile application ● Measurement skills ● Observation skills ● Sketching skills ● Operating camera ● Analytical skills ● Planning skills Attitude, safety and environmental concern ● Attention to detail ● Proper handling of tools & equipment ● Effective time management ● Being team player ● Having integrity and work ethics ● Encouraging inclusive participation ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation ● Ensuring to avoid damage to existing vegetation ● Ensuring to be aware of existing cultural and heritage sites B1.02 Conducting Initial Environment Examination (IEE) Knowledge ● Purpose of Initial Environment Examination (IEE) ● Principles of site analysis ● Environmental impacts of landscape activities ● Soil, water, vegetation and wildlife basics ● Environmental protection measures ● Introduction to relevant environmental guidelines and regulations ● Importance of obtaining site clearance/permit Skills ● Using GPS ● Using mobile application ● Operating camera ● Observation skills ● Data recording skills ● Analytical skills ● Planning skills Attitude, safety and environmental concern ● Attention to detail ● Proper handling of tools & equipment ● Effective time management ● Being team player ● Having integrity and work ethics ● Encouraging inclusive participation
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	• Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation • Ensuring to avoid damage to existing vegetation B1.04 Conducting environmental risk assessment Knowledge • Basic concepts of hazard and risk • Types of common risk/hazards • Risk assessment process • Risk rating (likelihood and severity) • Risk mitigation and control measures Skills • Hazard identification skills • Operating camera • Observation skills • Analytical skills • Decision-making skills • Communication skills • Planning skills • Organizing skills Attitude, safety and environmental concern • Safety consciousness • Attention to detail • Being responsible and accountable • Being team player • Encouraging inclusive participation • Having work ethics and integrity • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulation B1.05 Preparing preliminary site analysis report Knowledge • Elements of preliminary site analysis report • SWOT analysis Skills • Using relevant software • Observation skills • ICT skills • Analytical skills • Recording and documentation skills • Planning skills Attitude, safety and environment concern • Attention to detail • Proper handling of tools and equipment • Effective time management • Being team player
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	• Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, IEE checklist/form, risk assessment form/checklist, masking tape, marker pen, color pencil/water color, sketch book, graph paper and clipboard Tools • Measuring tape, laser tape measure, scale ruler and compass Equipment • Camera, GPS and computer PPE • Workshop dress, safety boots, safety gloves, safety helmet and rain gears
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Planning and designing of landscape projects		
Module Code	2512-L4-M2		
Learning Outcome 2	Prepare landscape design concept		
Duration	Theory: 33 hours	Practical:104 hours	Total: 137 hours
Assessment Criteria	• Hand sketch is prepared as per the standard procedure • Design concept is prepared based on site analysis as per the standard procedure • Basic landscape concept design is prepared as per the standard procedure • Design concept is presented as per the standard procedure		
Content	B2.01 Preparing hand sketch Knowledge • Basic drawing principles • Basic working drawing • Types of lines and shapes • Proportion and balance • Basic shading techniques Skills • Hand-eye coordination • Observation skills • Freehand drawing skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Patience and concentration • Willingness to practice • Having patience • Being time conscious • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Safe handling of sharp tools • Ensuring to maintain clean work surface • Ensuring to follow OHS rules and regulation B2.02 Developing landscape concept based on site analysis Knowledge • Principles of design • Introduction to development of landscape themes • Importance of Contextual Design and Climate Responsive Design • Sustainable landscape design principles • Nationals' standards and other Landscape Architecture Standards • Introduction to case studies • Purpose of case studies		

	Skills • Interpretation skills • Observation skills • Analytical skills • ICT skills • Planning skills Attitude, safety and environmental concern • Ensuring to prepare inclusive design concept • Attention to detail • Being time conscious • Willingness to research and learn • Having work ethics and integrity • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation B3.03 Preparing basic landscape concept design Knowledge • Basics of preparing landscape concept design • Landscape graphic symbols and conventions • Principles of landscape composition • Fundamentals of landscape planning and Design Skills • Spatial planning skills • Basic design thinking • Creativity • Drawing and layout skills • Problem-solving skills • Planning skills • Analytical skills • Presentation skills Attitude, safety and environmental concern • Ensuring to prepare inclusive design concept • Willingness to explore and learn • Being time conscious • Having integrity and work ethics • Efficient use of resources • Proper handling of drawing tools • Encouraging inclusive participation • Ensuring to maintain clean and organized workspace • Ensuring to follow OHS rules and regulation B2.04 Presenting design concept Knowledge • Landscape design standards and best practices • Evaluation criteria for function, aesthetics, sustainability
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	Skills ● Critical thinking and evaluation skills ● Communication skills ● Presentation skills ● Problem solving skills Attitude, safety and environmental concern ● Openness to feedback (Peer and instructor-led critiques) ● Professional objectivity ● Ensuring to prepare inclusive design concept ● Responsibility towards quality improvement ● Encouraging inclusive participation ● Proper handling of documents and equipment ● Ensuring proper disposal of waste ● Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials ● Competency Based Learning Materials (CBLM)/Reference material ● Hand-outs ● Audio Visuals ● Reference books ● Manuals Learning facilities and infrastructure ● Classroom with adequate facilities ● Information Technology (IT) lab ● Library ● Workshop Materials ● Pen, pencil, note book, drawing sheet, sketchbooks, scale, clipboard, tracing paper, markers, report, color pencils/water color, sketch pen and inking pen and review checklist Tools ● Drawing board, scale ruler, adjustable set-square and T-square Equipment ● Camera, laptop/computer and projectors PPE ● Workshop dress and safety boots
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: ● Lecture ● Interactive discussion ● Demonstration ● Industrial visit/training ● Guided practice ● Group practice with project-based learning ● Individual practice with problem-based learning

	• Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Planning and designing of landscape projects		
Module Code	2512-L4-M2		
Learning Outcome 3	Prepare 2D design		
Duration	Theory:51 hours	Practical:202 hours	Total: 253 hours
Assessment Criteria	- Tools and features of 2D programming software are identified as per the standard procedure - Basic 2D CAD operation is performed as per the standard procedure - Detailed landscape is designed as per the standard procedure - Specifications and schedules are prepared as per the standard procedure - Estimation and costing is performed as per the standard procedure		
Content	B3.01 Identifying tools and features of 2D CAD programming Knowledge - Introduction to CAD (Computer-Aided Design) - Introduction to 2D software - Differences between 2D and 3D CAD - Applications of 2D CAD in design fields - Ergonomics and workstation safety (<i>Proper seating, screen height and keyboard/mouse use</i>) Skills - ICT Skills - Observation skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Attention to detail - Proper handling of tools and equipment - Effective time management - Integrity and work ethics - Efficient use of resources - Willingness to learn new technology - Encouraging inclusive participation - Ensuring appropriate use of PPE - Ensuring proper sitting posture - Avoid eye strain with screen breaks - Ensuring clean and organized workstation - Ensuring to follow computer lab rules - Ensuring to follow OHS rules and regulation B3.02 Performing basic 2D CAD operations Knowledge 2D Drafting Principles Relevant to Landscaping - Scale and measurement (Converting real site measurements to drawing scale) - Units and limits (Setting metric units, limits, and boundaries of the site plan) - Drafting conventions (Symbols and line types for plants, trees, hardscape, water features, Etc.)		

	<i>Skills</i> • ICT skills • Observation skills • Analytical skills • Planning skills • Creativity <i>Attitude, safety and environmental concern</i> • Attention to detail • Proper handling of tools and equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Willingness to explore and learn • Having patience • Ensuring accuracy and carefulness • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper sitting posture • Avoid eye strain with screen breaks • Ensuring clean and organized workstation • Ensuring to follow computer lab rules • Ensuring to follow OHS rules and regulation B3.03 Designing detailed landscape design in 2D <i>Knowledge</i> • Principles and elements of detailed design suitable for construction and estimation <i>Skills</i> • Spatial planning skills • Basic design thinking • Creativity • Problem-solving skills • ICT skills • Observation skills • Planning skills • Analytical skills • Presentation skills <i>Attitude, safety and environmental concern</i> • Ensuring to prepare inclusive design • Willingness to explore and learn • Being time conscious • Having integrity and work ethics • Efficient use of resources • Proper handling of drawing tools • Encouraging inclusive participation • Ensuring to follow OHS rules and regulations
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	• Ensuring to maintain clean and organized workspace • Ensuring to use appropriate PPE • Ensuring to follow computer lab rules • Ensuring proper sitting posture • Avoid eye strain with screen breaks B3.04 Preparing specification and schedules <i>Knowledge</i> • Introduction to specification • Introduction to material and plant schedules • Introduction to Microsoft excel and project management software <i>Skills</i> • Spatial planning skills • Basic design thinking • Creativity • Problem-solving skills • ICT skills • Observation skills • Planning skills • Analytical skills • Presentation skills <i>Attitude, safety and environmental concern</i> • Willingness to explore and learn • Being time conscious • Having integrity and work ethics • Efficient use of resources • Proper handling of drawing tools • Encouraging inclusive participation • Ensuring to follow OHS rules and regulations • Ensuring to maintain clean and organized workspace • Ensuring to use appropriate PPE • Ensuring to follow computer lab rules • Ensuring proper sitting posture • Avoid eye strain with screen breaks B3.05 Preparing estimation and costing <i>Knowledge</i> • Units of measurement and conversion • Mensuration • Types of estimates • Methods of estimation and costing • Local market rates • Introduction to Standard Bidding Documents and Procurement Rule/Act • Bill of Quantities • Introduction to BSR and LMC <i>Skills</i> • Interpreting BSR and LMC
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	• Numeracy skills • Measurement skills • Analytical skills • Planning skills • ICT skills <i>Attitude, safety and environmental concern</i> • Attention to detail • Proper handling of tools and equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring accuracy and carefulness • Ensuring to follow OHS rules and regulations • Ensuring appropriate use of PPE
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, drawing sheets, tracing paper, eraser and sharpener Tools • Scientific calculator Application/Software • AutoCAD, Microsoft excel, spreadsheet and project management software Equipment • Computer sets and smart board PPE • Workshop dress and safety boot

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Planning and designing of landscape projects		
Module Code	2512-L4-M2		
Learning Outcome 4	Prepare 3D design		
Duration	Theory:24 hours	Practical:133 hours	Total: 157 hours
Assessment Criteria	- Tools and features of 3D CAD programming is identified as per the standard procedure - Basic 3D CAD operations are performed as per the standard procedure - Landscape design is prepared in 3D as per the standard procedure - Rendering is performed as per standard procedure		
Content	B4.01 Identifying tools and features of 3D CAD programming Knowledge - Introduction to 3D modeling - File formats and data management Skills - ICT skills - Observation skills - Analytical skills Attitude, safety and environmental concern - Patience and accuracy to detail - Willingness to learn and explore new software - Having work ethics and integrity - Being accountable and responsible - Encouraging inclusive participation - Ensuring to follow OHS rules and regulations - Ensuring proper sitting posture - Avoid eye strain with screen breaks - Ensuring appropriate use of PPE - Ensuring to maintain clean and organized workstation - Ensuring to follow computer lab rules B4.02 Performing basic 3D CAD operations Knowledge - Scale and proportion - Landscape construction elements - Choice of materials and finishes - Coordinate systems/software Skills - Observation skills - ICT Skills - Analytical skills - Interpreting drawing - Problem Solving Skills Attitude, safety and environmental concern - Attention to detail - Proper handling of tools and equipment		

	• Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Willingness to explore and learn • Having patience • Ensuring accuracy and carefulness • Ensuring to follow OHS rules and regulations • Ensuring proper sitting posture • Avoid eye strain with screen breaks • Ensuring appropriate use of PPE • Ensuring to maintain clean and organized workstation • Ensuring data backup and file security B4.03 Preparing landscape Design in 3D <i>Knowledge</i> • Scale and proportion • Basic landscape construction techniques • Choice of materials and finishes • Sustainable and Environmental responsible design <i>Skills</i> • Observation skills • ICT Skills • Analytical skills • Interpreting drawing • Problem Solving Skills • Creativity <i>Attitude, safety and environmental concern</i> • Ensuring to prepare inclusive design • Attention to detail • Proper handling of tools and equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Willingness to explore and learn • Having patience • Ensuring accuracy and carefulness • Encouraging inclusive participation • Ensuring to follow OHS rules and regulations • Ensuring proper sitting posture • Avoid eye strain with screen breaks • Ensuring appropriate use of PPE • Ensuring to maintain clean and organized workstation • Ensuring data backup and file security
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	B4.04 Performing rendering Knowledge • Basic rendering principles • Shading techniques • Colour theory (basic) • Texture representation • Material specification Skills • Colouring skills • Creativity • Shading skills • Hand control and coordination • Observation skills • Analytical skills Attitude, safety and environmental concern • Having Patience • Proper handling of materials and sharp tools • Being time conscious • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, paper and reference material Software • 3D modelling software and rendering software Equipment • Computer sets and smart board PPE • Workshop dress and safety boots

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module 3
on
Managing landscape development work

MODULE INFORMATION

Occupation	Landscape Technologist
Competency Area	Manage landscape development works
Module Title	Managing landscape development works
Module Code	2512-L4-M3
Module Description	This module is structured to provide learners the knowledge, skills and right attitude required to prepare landscape development works, install hardscape, softscape and supervise landscape development work
Nominal Duration	512 Hours
Certificate Level/Qualification	Diploma
Pre-requisite	Completed 2512-L4-M2
Learning Outcome	1. Prepare landscape development works 2. Install hardscape 3. Install softscape 4. Supervise landscape development work

Module Title	Managing landscape development works		
Module Code	2512-L4-M3		
Learning Outcome 1	Prepare landscape development works		
Duration	Theory: 13 hours	Practical:11 hours	Total: 24 hours
Assessment Criteria	- Operational workplan is prepared as per the standard procedure - Resources are managed as per the standard procedure - Inventory of resources are maintained as per the standard procedure		
Content	C1.01 Preparing operational workplan Knowledge - Purpose of preparing operational plan - Techniques of preparing operational plan - Basics of project management Skills - Observation skills - ICT skills - Communication skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Proper handling of tools & equipment - Effective time management - Having integrity and work ethics - Efficient use of resources - Encouraging inclusive participation - Ensuring to follow OHS rules and regulation - Ensuring to maintain proper sitting position - Proper disposal and recycling of waste C1.02 Managing resources Knowledge - Introduction to procurement rules - Introduction to stock register and ledger - Introduction to Bhutan Standard Acts - Introduction to labour act - Importance of recording and reporting daily usage of resources Skills - Management skill - Communication skills - Planning skills - Analytical skills Attitude, safety and environmental concern - Proper handling of record book - Effective time management - Having integrity and work ethics		

	• Timely update of record • Being team player • Encouraging inclusive participation • Having sense of accountability • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C1.03 Maintaining inventory of resources Knowledge • Introduction to inventory management • “Live” Material/Perishables handling procedures for stored inventory • Shrinkage and loss • Seasonality of materials Skills • Observation skills • Analytical skills • Planning skills • ICT skills • Using camera • Record keeping skills • Organizing skills Attitude, safety and environmental concern • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook and stock register Tools • Calculator

	Application/software • MS project and spreadsheet Equipment • Computer and camera PPE • Workshop dress and safety boots
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Managing landscape development works		
Module Code	2512-L4-M3		
Learning Outcome 2	Install hardscape		
Duration	Theory: 53 hours	Practical:231 hours	Total: 284 hours
Assessment Criteria	• Site preparation is performed as per standard procedure • Drainage systems are installed as per the standard procedure • Retaining walls are constructed as per the standard procedure • Walkways are installed as per the standard procedure • Deck is installed as per the standard procedure • Irrigation systems are installed as per the standard procedure • Gazebos are constructed as per the standard procedure		
Content	C2.00 Introduction • Introduction to hardscape landscape elements ✓ Water features ✓ Playgrounds ✓ Furniture ✓ Taps ✓ Pavements ✓ Structures ✓ Fencing ✓ Lighting ✓ Irrigation systems ✓ Drainage systems C2.01 Performing site preparation Knowledge • Introduction to site preparation • Introduction to cut and fill excavation • Introduction to site condition (service lines,...) • Introduction to site layout Skills • Measurement skills • Using spirit level • Excavation Skills • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste		

	• Ensuring to follow OHS rules and regulation C2.02 Installing drainage systems <i>Knowledge</i> • Soil permeability and drainage capacity • Effect of soil type on drainage design • Introduction to water logging • Types of water filtration media • Types of drainage system and its application <i>Skills</i> • Interpreting drawing • Measurement skills • Using spirit level • Excavation Skills • Basic plumbing skills • Observation skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring to be inclusive while installing drainage system • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C2.03 Constructing retaining/RRM wall <i>Knowledge</i> • Types of walls used in landscaping and its purpose • Introduction to Random Rubble Masonry • Mix Ratios, cement setting time and purpose of curing • Purpose of weep holes • Definition of hydrostatic pressure <i>Skills</i> • Interpreting drawing • Basic masonry skill • Basic carpentry skills • Observation skills • Analytical skills • Planning skills • Problem solving skill <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics
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	• Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C2.04 Installing walkways/pavements <i>Knowledge</i> • Types of Walkways/pavements • Components of walkways • Walkways construction methods • Methods of curing • Introduction to patios <i>Skills</i> • Observation skills • Analytical skills • Planning skills • Basic masonry skills • Basic carpentry skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring to be inclusive while installing walkways • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C2.05 Installing Deck <i>Knowledge</i> • Types of Decks • Components of deck and platform • Purpose of decks in landscape design • Standard deck dimensions, levels and clearances • Introduction to sustainable deck construction (materials) <i>Skills</i> • Interpreting drawing • Observation skills • Analytical skills • Planning skills • Problem solving skills • Basic carpentry skills • Basic masonry skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management
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	• Having integrity and work ethics • Efficient use of resources • Ensuring to be inclusive while installing deck • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C2.06 Installing irrigation systems <i>Knowledge</i> • Principles of irrigation systems (drip, sprinkler and micro-irrigation) • Types of irrigation and its application • Irrigation layout • Types of sprinkler irrigation • Working principles • Components of sprinkler irrigation system • Advantages and disadvantage of sprinkler irrigation <i>Skills</i> • Interpreting drawing • Analytical skills • Observation skills • Planning skills • Basic plumbing skill <i>Attitude, safety and environmental concern</i> • Effective time management • Being team player • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Encouraging inclusive participation • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulation C2.07 Constructing Gazebos <i>Knowledge</i> • Types of rest spots and its construction materials • Components of gazebos • Introduction to landscape lighting <i>Skills</i> • Interpreting drawing • Observation skills • Analytical skills • Planning skills • Interpreting drawing • Basic carpentry skill • Basic Masonry skill
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	<i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring to include inclusive features while constructing gazebos • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation • Ensuring sustainable use of resources
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, PVC/HDPE pipes, pipe fittings, geotextile fabric, aggregates, grass, sand, cement, adhesive, bedding materials, bricks, stone, jointing union, threading tape, sprinkler set, jointing glue, water tank, pavers, nails, thread, sanding paper, planks, mason thread, pegs, chalk line, batten, gravels and roofing materials Tools • Pipe cutter/hacksaw, heating plate, concrete trowel/float, motor pan, hammer, spirit level, pegs, shovel, spade, knife, wrench set, pickaxe, measuring tape, try square, wheel barrow, rubber mallet/hammer, masonry trowel, straightedge, screed bar, masonry chisel, block splitter, brush, broom, pipe, mortar pan, basic masonry tools, basic carpentry tools, watering pipe, dressing hammer, spirit level, plumb bob, mixing tray and water level pipe Equipment • Excavation tool/equipment, laser level, water pump, soil compactor, stone cutter, angle grinder, wood planer, chain saw and cordless drill PPE • Workshop dress, safety boots, safety gloves, rain gears, safety goggles, safety helmet, safety mask and reflective vest

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Managing landscape development works		
Module Code	2512-L4-M3		
Learning Outcome 3	Install softscape		
Duration	Theory: 32 hours	Practical:151 hours	Total: 183 hours
Assessment Criteria	• Plantation site is prepared as per the standard procedure • Plantation is performed as per the standard procedure • Root balling is performed as per the standard procedure • Lawn developed as per the standard procedure		
Content	C3.01 Preparing plantation site Knowledge • Norms and standard for nursery and plantation • Importance of well-prepared sites for plantation • Basic soil science Skills • Operating mini tiller • Operating grass cutter • Operating soil auger • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring to prepare inclusive plantation site • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C3.02 Performing plantation • Basics of plant physiology • Planting distance/spacing and depth required for the plants • Factors affecting plant growth • Plant categories (plant life span, plant size, plant habitat) • Introduction to plant staking • Condition required for plantation (soil type, season and weather conditions) Skills • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management		

	• Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C3.03 Performing root balling Knowledge • Basics of root balling • Methods of root balling • Advantages and disadvantages of root balling • Condition required for root balling (plant types, soil type, season and weather conditions) Skills • Using secateur • Pruning skills • Observation skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C3.04 Developing lawn Knowledge • Condition required for lawn development (soil type, season and weather conditions) • Lawn grass variety • Importance of lawn development • Recommended seed rate • Types of irrigation and drainage system used for lawn • Methods of lawn development (seed or grass carpet/sod) • Importance of basic maintenance of farm machines • Turf fertilizer application and calculation • Turf pesticide application and calculation • Turf plant health care, diseases and pests • Skills • Operating mini tiller • Operating grass cutter • Analytical skills
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	• Planning skills • Seed broadcasting skills • Observation skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, synthetic fertilizers, leafmould/compost, marker, label, soil amendments, organic manure, mulch, chemical fertilizer, twine or strong rope, stake for support, top soil, sand, seed, planting materials, hessian cloth, lawn grass seeds, sand, aggregates, geotextile membrane, perforated pipe, sprinkler sets, pipe & fittings, lime, green net, irrigation sets, fungicides, herbicides and fencing poles Tools • Wheel barrow, spade, shovel, hoe, crowbar, pickaxe, measuring tape, sickle, jute rope, secateur or pruners, knapsack sprayer, watering can, pipe, soil compactor, weighing balance, hedge shear, spirit level, soil sieve and rake Equipment • Soil auger, mini tiller, grass cutter and fertilizer spreader PPE • Workshop dress, safety boots, safety gloves and rain gears

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Managing landscape development works		
Module Code	2512-L4-M3		
Learning Outcome 4	Supervise landscape development work		
Duration	Theory: 10 hours	Practical:11 hours	Total: 21 hours
Assessment Criteria	• Daily work is supervised as per the standard procedure • Work quality and quantity is inspected as per the standard procedure • Progress report is maintained as per the standard procedure		
Content	C4.01 Supervising daily work Knowledge • Landscape development workflow • Purpose of tool box meeting • Introduction to quality standards • Purpose of daily supervision Skills • Interpreting drawing • Observation skills • Analytical skills • Planning skills • Management skills • Organizing skills • Record keeping skills • ICT skills • Communication skills • Operating camera Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C4.02 Inspecting work quality and quantity • Work Quality and Measurement Standards • Methods of assessing materials quality • Purpose of work inspection Skills • Operating camera • Observation skills • Analytical skills • Planning skills • ICT skills		

	• Record keeping skills • Report writing skills <i>Attitude, safety and environmental concern</i> • Attention to details • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Encouraging inclusive participation • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation C4.03 Maintaining progress report <i>Knowledge</i> • Purpose of maintaining progress report • Elements of progress report • Methods of writing progress report • Introduction to filing index and documentation <i>Skills</i> • Observation skills • Analytical skills • Planning skills • ICT skills • Record keeping skills • Report writing skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop

	Materials • Pen, pencil, notebook, operational plan and attendance sheet Tools • Measuring tape and spirit level Equipment • Computer, GPS, laser tape measure, printer and camera PPE • Workshop dress, safety boots, safety gloves and rain gears
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module 4
on
Managing maintenance of landscape works

MODULE INFORMATION

Occupation	Landscape Technologist
Competency Area	Manage maintenance of landscape works
Module Title	Managing maintenance of landscape works
Module Code	2512-L4-M4
Module Description	This module is structured to provide learners the knowledge, skills and right attitude required to perform maintenance of hardscape, softscape and irrigation system
Nominal Duration	131 Hours
Certificate level/Qualification	Diploma
Pre-requisite	Completed 25-L4-L3
Learning Outcome	1. Perform maintenance of hardscape 2. Perform maintenance of softscape 3. Manage irrigation and water efficiency system

Module Title	Managing maintenance of landscape works		
Module Code	2512-L4-M4		
Learning Outcome 1	Perform maintenance of hardscape		
Duration	Theory: 14 hours	Practical:31 hours	Total: 45 hours
Assessment Criteria	- Preparation for maintenance is performed as per the standard procedure - Estimation and costing is performed as per the standard procedure - Maintenance is performed as per the standard procedure		
Content	D1.01 Preparing for maintenance work Knowledge - Introduction to maintenance plan - Importance of maintenance planning and inspection - Common hardscape maintenance works - Causes of hardscape deterioration - Introduction to protective coatings and sealants - Geomorphic Processes and prevention Skills - Operating camera - Numeracy skills - Observation skills - Analytical skills - Planning skills - Problem solving skill - ICT skills Attitude, safety and environmental concern - Proper handling of tools & equipment - Effective time management - Having integrity and work ethics - Efficient use of materials - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensuring to follow OHS rules and regulation D1.02 Preparing estimation and costing Knowledge - Landscape maintenance materials and specifications - Bill of Quantities Skills - Interpreting BSR and LMC - Numeracy skills - Measurement skills - Analytical skills - Planning skills - ICT skills Attitude, safety and environmental concern - Attention to detail		

	• Proper handling of tools and equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring accuracy and carefulness • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulation D1.03 Performing maintenance work Knowledge • Types of maintenance • Common causes, symptoms and remedies of hardscape damages • Segregation methods of waste • Introduction to 4Rs Skills • Observation skills • Analytical skills • Planning skills • Basic masonry skill • Problem solving skill • Basic carpentry skill Attitude, safety and environmental concern • Proper handling of tools & equipment • Being team player • Effective time management • Having integrity and work ethics • Efficient use of materials • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, checklist, drawing and rate analysis reference/manual, stone, cement, sand, aggregate, tiles, pipe, concrete sealer, paver, paver sealant, waterproof coating, timber, MS rod, adhesive, anti-slip coating, mason threads, pegs, wire, sockets, bulbs, nails and anti-corrosion paint

	Tools • Calculator, try square, spade, shovel, pickaxe, crowbar, hammer, chisel, trowel, spirit level, plumb bob, measuring tape, mortar pan, wheelbarrow, water bucket, water level pipe, handsaw, mallet, neon tester, screwdriver, plier, broom and tool bag Application • Spreadsheet Equipment • Computer sets, printer, smartboard, stone cutter, angle grinder, cordless drill and camera PPE • Workshop dress, safety boots, safety gloves, rain gears, safety goggles, safety helmet and safety mask
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

Module Title	Managing maintenance of landscape works		
Module Code	2512-L4-M4		
Learning Outcome 2	Perform maintenance of softscape		
Duration	Theory: 28 hours	Practical:28 hours	Total: 56 hours
Assessment Criteria	• Estimation and costing is performed as per the standard procedure • Plant maintenance is performed as per the standard procedure • Soil maintenance is performed as per the standard procedure • Lawn maintenance is performed as per standard procedure		
Content	D2.01 Performing estimation and costing Knowledge • Norms and standard for nursery and plantation • Landscape maintenance materials and specifications • Bill of Quantities Skills • Interpreting BSR and LMC • Numeracy skills • Measurement skills • Analytical skills • Planning skills • ICT skills Attitude, safety and environmental concern • Attention to detail • Proper handling of tools and equipment • Effective time management • Having integrity and work ethics • Efficient use of resources • Ensuring accuracy and carefulness • Ensuring appropriate use of PPE • Ensuring to follow OHS rules and regulation D2.02 Performing plant maintenance Knowledge • Methods of plant maintenance • Sustainable methods of landscape maintenance Skills • Training and pruning skills • Observation skills • Analytical skills • Planning skills • Using pruner • Using knapsack sprayer • Using secateur Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management		

	• Being team player • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation D2.03 Performing soil maintenance <i>Knowledge</i> • Integrated soil fertility management • Causes of soil degradation Type of soil amendments • Methods of soil maintenance • Composting methods (plant material, wood, bark construction material, hugelkultur, compost teas) <i>Skills</i> • Observation skills • Analytical skills • Planning skills • Operating soil tiller <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Being team player • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation D2.04 Performing lawn maintenance <i>Knowledge</i> • Types of maintenances required for lawn • Condition for application of fertilizers, pesticides, fungicides, top dressing and compost • Introduction to grass cutting and edging (Technical recommendation) • Methods of cutting grass • Sustainable lawn maintenance methods • Native grass uses <i>Skills</i> • Operating lawn mower • Operating grass cutter • Using knapsack sprayer • Operating soil tiller • Using soil aerator • Observation skills • Analytical skills • Planning skills
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	<i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Being team player • Having integrity and work ethics • Efficient use of resources • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, field book, fungicides, pesticides, leafmould/compost, lime, fertilizer, soilless media, pipe, pesticide, seeds, sod and pipe Tools • Wheel barrow, spade, shovel, hoe, weighing balance, secateur, pruner, shear, sickle, knife, pruning saw, knapsack sprayer, bucket, calculator, aerator sandal, sieve and fertilizer spreader Equipment • Chainsaw, hedge trimmer, brush cutter, soil tiller, lawn mower, lawn blower, lawn roller and line trimmer PPE • Workshop dress, safety gloves, rain gear, safety mask, safety goggles and ear plugs
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)

Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work
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Module Title	Managing maintenance of landscape works		
Module Code	2512-L4-M4		
Learning Outcome 3	Manage irrigation and water efficiency system		
Duration	Theory: 11 hours	Practical:19 hours	Total: 30 hours
Assessment Criteria	• Irrigation system is monitored as per the standard procedure • Water efficiency irrigation is implemented as per standard procedure • Periodic maintenance of irrigation system is performed as per standard procedure		
Content	D3.01 Monitor irrigation system Knowledge • Components of irrigation system • Purpose of monitoring irrigation system Skills • Observation skills • Analytical skills • Planning skills • Basic plumbing skills • Record keeping skills • Report writing skills • ICT skills Attitude, safety and environmental concern • Proper handling of tools & equipment • Effective time management • Being team player • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation D3.02 Implementing water-efficient irrigation practices Knowledge • Principles of irrigation systems (drip, sprinkler and micro-irrigation) • Water requirement of ornamental/landscape plants • Soil-water relationship • Evapotranspiration concept • Irrigation scheduling principles • Water conservation techniques • Sustainable landscape management Skills • Analytical skill • Problem-solving skill • Observation skill • Planning skill • Decision making skills		

	• Documentation skill • Basic plumbing skills <i>Attitude, safety and environmental concern</i> • Effective time management • Having integrity and work ethics • Efficient use of resources • Attention to detail • Being team player • Safe handling of irrigation tools and equipment • Ensuring to maintain clean and safe work environment • Ensuring to create water conservation awareness • Ensuring to take initiative in improving system efficiency D3.03 Conducting periodic maintenance of irrigation <i>Knowledge</i> • Purpose of regular irrigation maintenance • Common causes and remedies of irrigation system failure <i>Skills</i> • Observation skills • Analytical skills • Planning skills • Basic plumbing skills <i>Attitude, safety and environmental concern</i> • Proper handling of tools & equipment • Effective time management • Being team player • Having integrity and work ethics • Efficient use of resources • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference material • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen, pencil, notebook, checklist, drip lines, low-flow sprinkler heads, pipe & fittings, sprinkler, nozzles, gate valve, thread tape, union and mulching materials

	Tools • Pressure gauge, soil moisture meter, flow meter, pipe cutter, pipe wrench, spade, pickaxe, heating plate, knife, hacksaw, plier and pipe wrench Equipment • Computer, printer, GPS, camera and irrigation controller PPE • Workshop dress, safety boots, safety gloves and rain gears
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

ANNEXES

Annex I: Time Duration

Time Distribution (Regular course)					
Landscape Technology Diploma					
Module Title	Learning outcomes	Tasks	Theory (Hours)	Practical (Hours)	Total (hours)
A: Carry out ornamental plant operations	A1: Perform plant identification	A1.00 Introductory knowledge	14	0	14
		A1.01 Identify common ornamental trees	21	21	42
		A1.02 Identify common ornamental shrubs	21	21	42
		A1.03 Identify common ornamental herbs	21	21	42
		A1.04 Identify common ornamental climbers/vines	21	14	35
		A1.05 Identify common ornamental ferns and grasses	21	14	35
		A1.06 Maintain Herbarium	5	4	9
	Sub Total Duration		124	95	219
	A2: Perform nursery management	A2.01 Construct green house	7	35	42
		A2.02 Prepare growing media	3	4	7
		A2.03 Perform seedling care	14	7	21
	Sub Total Duration		24	46	70
	A3: Perform plant propagation	A3.01 Perform seed propagation	7	14	21
		A3.02 Perform air layering	3	4	7
		A3.03 Perform cutting	3	4	7
		A3.04 Perform grafting	4	10	14
		A3.05 Perform budding	4	10	14
		A3.06 Perform plant division	2	5	7
	Sub Total Duration		23	47	70
	A4: Perform plant health management	A4.01 Identify common pests, diseases and weeds	14	21	35
		A4.02 Manage pests	14	7	21
		A4.03 Manage diseases	14	7	21
		A4.04 Manage weeds	14	7	21
		A4.05 Perform plant nutrient management	14	7	21
		A4.06 Perform pruning and thinning	4	10	14
	Sub Total Duration		74	59	133
	Total Duration (A)		245	247	492
B. Plan and Design Landscape Projects	B1: Analyse Site Conditions and Requirements	B1.01 Conduct site survey	7	14	21
		B1.02 Conduct Initial Environment Examination (IEE)	7	7	14
		B1.03 Conduct risk assessment	3	4	7
		B1.04 Prepare basic site map	4	14	18
		B1.05 Prepare basic site analysis report	2	5	7
	Sub Total Duration		23	44	67

	B2: Prepare Landscape Design Concept	B2.01 Prepare hand sketch	21	28	49
		B2.02 Develop design concept based on site analysis	3	11	14
		B2.03 Prepare basic landscape concept design	7	60	67
		B2.04 Present design concept	2	5	7
	Sub Total Duration		33	104	137
	B3: Prepare 2D design	B3.01 Identify tools and features of 2D CAD programming	7	7	14
		B3.02 Perform basic 2D CAD operations	7	63	70
		B3.03 Prepare detailed landscape design	3	95	98
		B3.04 Prepare specifications and schedules	6	30	36
		B3.05 Perform estimation and costing	28	7	35
	Sub Total Duration		51	202	253
	B4: Prepare 3D design and specifications	B4.01 Identify tools and features of 3D CAD programming	7	7	14
		B4.02 Perform basic 3D CAD operations	7	35	42
		B4.03 Prepare landscape design	3	70	73
		B4.04 Perform rendering	7	21	28
	Sub Total Duration		24	133	157
	Total Duration (B)		131	483	614
C: Manage landscape works	C1: Prepare Landscape Development works	C1.01 Prepare operational workplan	3	4	7
		C1.02 Manage resources	7	3	10
		C1.03 Maintain inventory of resources	3	4	7
	Sub Total Duration		13	11	24
	C2: Install hardscape	C2.01 Perform site preparation	4	14	18
		C2.02 Install drainage systems	14	28	42
		C2.03 Install irrigation systems	7	21	28
		C2.04 Install walkways	7	35	42
		C2.05 Install deck	7	35	42
		C2.06 Construct retaining walls	7	28	35
		C2.07 Construct gazebos	7	70	77
	Sub Total Duration		53	231	284
	C3: Install softscape	C3.01 Prepare plantation site	7	21	28
		C3.02 Perform plantation	7	21	28
		C3.03 Perform root balling	4	14	18
		C3.04 Develop lawn	7	30	37
		C3.05 Develop turf	7	65	72
	Sub Total Duration		32	151	183
	C4: Supervise landscape development work	C4.01 Supervise daily work	4	3	7
		C4.02 Inspect work quality and quantity	3	4	7
		C4.03 Maintain progress report	3	4	7

	Sub Total Duration		10	11	21
	Total Duration (C)		108	404	512
D: Manage maintenance of landscape works	D1: Perform maintenance of hardscape	D1.01 Prepare for maintenance work	3	14	17
		D1.02 Prepare estimation and costing	7	7	14
		D1.03 Perform maintenance	4	10	14
	Sub Total Duration		14	31	45
	D2: Perform maintenance of softscape	D2.01 Prepare estimation and costing	7	7	14
		D2.02 Perform plant maintenance	7	7	14
		D2.03 Perform soil maintenance	7	7	14
		D2.04 Perform lawn/turf maintenance	7	7	14
	Sub Total Duration		28	28	56
	D3: Manage irrigation and water efficiency system	D3.01 Monitor irrigation system	2	5	7
		D3.02 Implement water efficient irrigation practices	7	7	14
		D3.03 Conduct periodic maintenance of irrigation system	2	7	9
	Sub Total Duration		11	19	30
	Total Duration (D)		53	78	131
Grand Total Duration (Hours)			537	1212	1749

Annex II: Module Recognition

This is to verify that

Mr/Ms.....

has completed module on

.....

Covering following learning outcomes:

1.
2.
3.

Instructor:

Head of the Department:

.....

.....

Signature:

Signature:

Date: / / (dd/mm/yyyy)
.....(dd/mm/yyyy)

Date: / /

Head of the Institute:

Trained Assessor (Institute)/Exam OC:

.....

.....

Signature:

Signature:

Date: / ... / (dd/mm/yyyy)

Date: / /(dd/mm/yyyy)

Annex III: Lesson Plan
Lesson Plan

Course Title:				NC Level:
Module Code:				Duration:
Module Title:				
Learning Outcome:				
Skill/Task/Topic:				
Terminal Performance Objective:				
<i>(Note: Write narrative statement extracted from TPO of Task Sheet)</i>				
Enabling Objectives (Related knowledge):				
<i>By the end of the lesson learners will be able to:</i>				
i) ii) iii)				
What (Content/Activity)	Who (T/L)	How (Methods/ Media)	Duration (Min.)	Questions
Introduction:				
Main body				
Conclusion				
Projects/Problems:				
Instructional Resources Plan				

Skills/Task/Topic:				
No. of Trainees:				
Sl. No.:	Instructional materials/resources	Specifications	Qty.	Remarks
Prepared by :		Signature	Date:	
Revised by:		Signature	Date:	
Approved by:		Signature	Date:	

Task sheet

TS-1/4: Practical Plan

TS-1/4: Practical Plan			
Course Title:		N C Level:	
Module code:		Duration:	
Module Title			
Learning outcome			
Skills/Task Title:		Task no:	
Terminal Performance Objective: <i>Given:</i> <i>Cue:</i> <i>Who:</i> <i>What:</i> <i>Within:</i> <i>How well:</i> - - -			
Enabling Objectives (Related Skills): <i>By the end of a lesson, the learners will be able to:</i> i) ii) iii) iv)			
Activities	Who (T/L)	How (methods/ media)	Duration
Project/Assignment:			

TS-2/4: Tool and Equipment required:						
Sl no.	Particulars	Specifications	Qty.	Remarks		
Training Materials required:						
Sl no.	Particulars	Specifications	Qty.	Rate	Amount	Remarks
TS-3/4: Performance Guide						
Skill/Task:					Date:	
Directions: Use the following performances criteria to rate the learner. Check YES/NO to indicate whether the learner performed each step as indicated or not?						
Sl. No:	Steps				Yes	No
Note: Critical steps: All * marked steps should be carried out very carefully. For a quality performance guide, all items should be checked "YES"						

TS-4/4: Instruction and Drawing		
<i>General Instructions for Trainees</i> - i) - ii) - iii) - iv)		
<i>Drawing (if any)</i>		
Safety Precaution - i) - ii) - iii)		
Prepared by :	Signature	Date:
Revised By:	Signature	Date:
Approved by :	Signature	Date:

Annex IV: Course Plan
Institutes letter head and Logo

(Trade)YEAR PLAN- _____ **Semester** _____ **(Year)**

Trade: NC Level:			Schedule																																Total Hours												
Module Code	Module Title	Learning Outcome	Feb.				March				April				May				June				July				Aug.				Sept					Oct.				Nov.							
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2	3	4								
OJT																																															
Assessment and Certification																																															

Prepared by:

Verified & Approved by:

Date:

Monthly/Weekly Plan

Month: Trade: Trainer:

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 01							
Week 02							
Week 03							
Week 04							
Week 05							

Developed by: Approved by:

Date



For more information please contact:

Technical Trainers Training and Resource Center (TTTRC), DWPSD

Email: dwpsd@moesd.gov.bt/tttrd@moesd.gov.bt