Syllabus for ROOFTOP GARDENING

Course Name	**ROOFTOP GARDENING, V2**
Course Code	**STC - AGR/2022/0236, V2**
Occupation	Urban farmer
Job Description	The urban farmer is skilled in the basic principles of natural farming and is able to grow good quality food independent of synthetic or artificial chemical inputs. He/she is also skilled in all aspects of efficient garden design and management and thus is able to run a natural food production operation smoothly.
Anticipated Volume of Training	390 Hrs (Theory: 90 Hrs + Practical: 180 Hrs + Employability Skill: 60 Hrs.+ OJT: 60)
Trainees' Entry Qualification	Class 8 pass and pursing continuous regular schooling, OR Class 8 Pass with 1 year experience, OR Class 8 Pass + ITI, OR Class 10 Pass OR previous relevant qualification of NSQF Level 2 with 1 yr experience
Trainers Qualification	BSC AGRICULTURE/ HORTICULTURE/BOTANY/ ZOOLOGY / FORESTRY, 2 YEARS IN RELEVANT FIELD

Structure of Course:

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	OJT (Hrs)	Total (Hrs)
1	Introduction and rooftop gardening primer	Summarize the importance of good soil and infer gross quality of a given soil sample.	10	20		30
2	Fundamental garden design concepts	Identify and analyze sectors of natural influence, identify local natural resources and create detailed garden maps using the aforementioned data.	20	40		60
3	Fundamentals of plant biology and ecology	Identify and interpret ecological interactions related to plants and apply the same in gardening design and planning.	20	40		60
4	Critical gardening skills	Plan and demonstrate harvesting of produce and seed from healthy plants grown sustainably using locally derived resources.	20	40		60
5	Critical management skills	Operate garden tools safely and correctly and demonstrate proper maintenance and management of the garden and its associated inventory.	20	40		60
6		**OJT**			60	60
7		**Employability skill**	60			60
		TOTAL:	**150**	**180**	**60**	**390**

SYLLABUS:

Module No. 1: Introduction and rooftop gardening primer

Outcome: Summarize the importance of good soil and infer gross quality of a given soil sample.

Theory Content:

- Classroom etiquette and discipline. Importance of participation, attention and questioning.
- Importance of rooftop gardening in the current global scenario. Soil degradation – causes and global impacts.
- Basic Soil Theory – components (physical/biological/chemical) and structure.
- Gross characterization of soil quality/health.

Practical Content:

- Simple soil testing for sand/silt/clay proportion
- Gross characterization of soil quality/health by observation (Jar tests/water holding capacity test/aggregate size and quality analysis)

Module No. 2: Fundamental garden design concepts

Outcome: Identify and analyze sectors of natural influence, identify local natural resources and create detailed garden maps using the aforementioned data.

Theory Content:

- Basics of mapping in designing gardens
- Basics of weather overlays– sun-shade cycles, prevailing winds, monsoon winds, etc.
- Elements of good garden design – efficient utilization and modification of free natural resources (sun, wind, water).
- Efficient and cost-effective garden bed designs and placement; ensuring proper access, drainage, shade/sun, wind, etc.

Practical Content:

- Field visits to different gardens/organic farms (to develop aesthetic sense of design)
- Practicing adjoining techniques as assignments

Module No. 3: Fundamentals of plant biology and ecology

Outcome: Identify and interpret ecological interactions related to plants and apply the same in gardening design and planning.

Theory Content:

- Basic plant physiology; Plant nutrients; Identifying characters of a healthy plant
- Solar energy distribution in multi-layered farming systems and energy wastage in monocropping systems.

- Cooperation between plants and fungi/bacteria; basics of the rhizosphere; basics of nitrogen fixation.
- Basics of mycorrhizal network and nutrient/information transfer along the same.
- Trap plants/Volunteer plants/Pest repellant plants.
- Importance of pollinators in crop yield and pollinator attractor plants.
- Companion planting and intercropping.
- Importance of designing a diverse system.
- Pests and causes of increased pest populations; Biological pest control.
- Identification of plant diseases/deficiencies and methods of mitigating the same.

Practical Content:

- Demonstration of specimens/plants
- Field visits to different gardens.
- Audio-visual aid

Module No. 4: Critical gardening skills

Outcome: Plan and demonstrate harvesting of produce and seed from healthy plants grown sustainably using locally derived resources.

Theory Content:

- Importance of Carbon as a nutrient anchor; Nitrogen-Carbon ratios
- Composting methods, Broad-spectrum liquid soil amendment preparation methods. Utilization of local resources.
- Creating good soil by mixing different elements.
- Preparation of insect repellants using local resources.
- Plant selection for the garden; making plant calendars.
- Basics of preparing garden beds.
- Tools and implements related to gardening and their proper use.
- Methods of planting; preparing, maintaining nurseries and seedlings monitoring plant growth, identifying right time for harvest
- Maintaining plants – correct pruning, grooming, etc.
- Plant propagation techniques.
- Proper seed extraction and storage of seeds for next season.

Practical Content:

- Demonstration of adjoining theoretical techniques

Module No. 5: Critical management skills

Outcome: Operate garden tools safely and correctly and demonstrate proper maintenance and management of the garden and its associated inventory.

Theory Content:

- Wise selection of crops/varieties suitable for rooftop,
- Quality management issues,
- Organic approach of gardening,
- Designing a safe garden considering both architectural and engineering ways,
- Water management,

- High density planting and
- Consideration of gender during special/emergency training

Practical Content:

- Demonstration of proper tool use and maintenance
- Emergency training

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Summarize the importance of good soil and infer gross quality of a given soil sample.	**After completion of this module students will be able to:** 1.1Learn about the importance of rooftop gardening 1.2 Know the basics of soil 1.3 Justify the soil with specific plant requirements 1.4 Handle simple soil testing kits 1.5 Grossly characterize the soil quality/health
2	Identify and analyze sectors of natural influence, identify local natural resources and create detailed garden maps using the aforementioned data.	**After completion of this module students will be able to:** 2.1 Learn the basics of mapping in designing 2.2 Know about the elements and linkage with natural resources including weather 2.3 Develop aesthetic sense of design eventually 2.4Identify the most efficient and cost-effective designs 2.5 Identify the backward and forward linkage on this venture
3	Identify and interpret ecological interactions related to plants and apply the same in gardening design and planning.	**After completion of this module students will be able to:** 3.1 Design a diverse ecosystem with ideal plants 3.2 Learn the basics of micro and macro environment 3.3 Comprehend multi-layered farming and energy wastage in monocropping 3.4 Identify plant enemies and deficiencies, if any 3.5 Mitigate properly with special focus on Biological control.
4	Plan and demonstrate harvesting of produce and seed from healthy plants grown sustainably using locally derived resources.	**After completion of this module students will be able to:** 4.1 Create good and healthy soil 4.2 Select suitable plants 4.3 Expertise on basic plant nutrients, composting, 4.4 Prepare garden beds, propagate plants, maintain plants, extract and store seeds 4.5 Prepare plant calendars
5	Operate garden tools safely and correctly and demonstrate proper maintenance and management of the garden and its associated inventory.	**After completion of this module students will be able to:** 5.1 List the safety rules for hand tools. 5.2 Describe the purpose, use of hand tools for crops/varieties suitable for rooftop.

Module No.	Outcome	Assessment Criteria
		5.3 Expertise on tools for quality-, water-, organic- and high density planting management 5.4 Design a safe garden considering both architectural and engineering means 5.5 Consider gender issues wisely for efficiency and precision

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

Sl No	Items with description	Qty
1	Gardening gloves	30
2	Safety glasses	30
3	Gumboots/safety boots	30
4	Hats	30
5	Funnel (plastic/glass)	15
6	Stirrer (glass/plastic)	15
7	Measuring cylinder (plastic/glass) (100 mL, 500 mL, 1 L)	10 ea
8	Glass beaker	15
9	Test tubes	20
10	Forceps	20
11	pH strip packs	30
12	Secateurs	10
13	Sickle	10
14	Hose	5
15	Double sided rake and trowel	10
16	Sprayer (15L and 5L)	10
17	Watering cans with shower head	10
18	Trigger sprayer (1L or 500mL)	10
19	Weeder (double prong and single prong)	10 ea
20	Hand Cultivator	10
21	Long Handle cultivator	10
22	Shovel	10
23	Pickaxe	10
24	Hoe	10
25	Claw hammer, screwdriver, wrench and assorted common tools	5 ea
26	Baskets	15
27	Plastic crates	200
28	Pruning knives (long and short)	10 ea
29	Lopper	10
30	Garden knife	10
31	Auger	10
32	Hedge shears	10
33	Pitchfork	10
34	Drip irrigation system (50 Mtr)	10
35	Composting bin	5
36	Shade net (50% and 75%)	1000 sq ft
37	GI wire	10 kg
38	Bamboo poles/PVC poles	50
39	Grow tubs	200
40	Grow bags	500
41	Seedling tray	200
42	Ziploc bags	500

Sl No	Items with description	Qty
43	Cocopeat 5 kg blocks	30
44	Buckets with mug	15
45	Drum with lid	5
46	Jerry can (10L, 15L)	10 ea
47	Sieve (plastic/metal)	10
48	Brooms	30
49	Tarpaulin (UV treated)	10
50	Garbage bins (colored for waste segregation)	15
51	Garbage bags (preferably biodegradable)	300
52	Airtight Storage container (plastic/metal)	25
53	Silica gel	5 kg
54	Garden rope	1000 mtr
55	Aeration pump	5
56	Perforated polybag or biodegradable substitute	1000 pcs
57	Weighing scale (100 gm and 25 kg)	2 ea
58	Wheelbarrow	3
59	Lux meter	2
60	Water level/Laser level	5
61	Weather meter	5
62	Microscope (up to 100X preferable)	3
63	Glass slides (100 per pack)	10 packs
64	Glycerin or DPX	5
65	Dropper (Plastic/glass)	30
66	Fire extinguisher	5
67	First aid kit	10
68	Assorted stationery pack	30
69	Vermicompost	50 kg
70	Compost	50 kg
71	Soil	100 kg
72	Sand	100 kg

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks
Summarize the importance of good soil and infer gross quality of a given soil sample.	AGR/0236/OC1	20	90
Identify and analyze sectors of natural influence, identify local natural resources and create detailed garden maps using the aforementioned data.	AGR/0236/OC2	30	140
Identify and interpret ecological interactions related to plants and apply the same in gardening design and planning.	AGR/0236/OC3	30	140
Plan and demonstrate harvesting of produce and seed from healthy plants grown sustainably using locally derived resources.	AGR/0236/OC4	30	140
Operate garden tools safely and correctly and demonstrate proper maintenance and management of the garden and its associated inventory.	AGR/0236/OC5	40	140
Work in real job situation (OJT)	AGR/0236/OC6	0	150
Employability Skills- 60 hrs.	DGT/VSQ/N0102	50	0