



NATIONAL BOARD FOR TECHNICAL EDUCATION

PLOT B BIDA ROAD, P.M.B. 2239, KADUNA, NIGERIA

**HIGHER NATIONAL DIPLOMA
IN**

ORGANIC CROP PRODUCTION TECHNOLOGY

CURRICULUM AND COURSE SPECIFICATIONS

JUNE, 2026

PREFACE

The transformation of Nigeria's agricultural sector remains central to the nation's aspirations for sustainable economic growth, food security, job creation, industrial development, and poverty reduction. As agriculture continues to evolve in response to technological advancements, climate change, emerging global market demands, and the need for increased productivity across agricultural value chains, it has become imperative to ensure that curricula in Nigerian tertiary institutions remain relevant, responsive, and aligned with contemporary industry requirements. It is against this backdrop that we embarked on the comprehensive review and modernization of Agricultural curricula for Nigerian tertiary institutions. The review process was designed to address identified skills gaps, integrate emerging technologies and innovations, strengthen entrepreneurship and employability competencies, promote climate-smart agriculture, and align training programmes with the industry expectations and global best practices. The successful execution of this important project was made possible through the invaluable support and commitment of key stakeholders. I wish to express profound appreciation to the Honourable Minister of Education for providing the policy direction and leadership that facilitated this initiative. I also extend sincere gratitude to the Honourable Minister of Agriculture and Food Security and the Honourable Minister of Livestock Development for their unwavering support, technical contributions, and commitment to strengthening agricultural education and workforce development in Nigeria. Special appreciation goes to the Tertiary Education Trust Fund (TETFund) for providing the special intervention grant that enabled the conduct of nationwide skills gap analyses and supported the series of national curriculum review and development workshops. The findings from the skills gap studies provided critical evidence and industry insights that guided the review process and ensured that the curricula reflect current and future workforce requirements within the agricultural sector.

I also acknowledge with gratitude the immense contributions of the Sector Skills Council for Agriculture, whose expertise and industry perspectives greatly enriched the curriculum development process. Equally commendable are the efforts of members of the Implementation Committee, resource persons, industry experts, professional bodies, French Embassy in Nigeria, regulatory agencies, academic institutions, employers, development partners, and other stakeholders who devoted their time, knowledge, and experience to the various workshops and technical sessions. The revised curricula represent a collective national effort to produce graduates equipped with relevant knowledge, practical skills, digital competencies, entrepreneurial capabilities, and professional attitudes required to drive innovation and productivity across Nigeria's agronomy, forestry, fisheries and livestock sectors. It is my expectation that Institutions offering these programmes will faithfully implement the curricula and continue to collaborate with industry to ensure sustained relevance and quality. I commend all stakeholders for their dedication and contributions to this landmark achievement and look forward to the successful implementation of these curricula for the benefit of our dear nation.

Professor Idris M. Bugaje, FNSE
Chairman, Implementation Committee

EXECUTIVE SECRETARY

National Board for Technical Education (NBTE), Kaduna

ACKNOWLEDGEMENT

The National Board for Technical Education (NBTE) expresses its profound appreciation to all individuals and organizations whose invaluable support, expertise, and commitment made the successful review and modernization of the Agricultural Education curricula for Nigerian tertiary institutions possible. Our sincere gratitude goes to the Honourable Minister of Education for providing the policy direction and leadership that made this national initiative possible. We also appreciate the Honourable Minister of Agriculture and Food Security and the Honourable Minister of Livestock Development for their technical guidance, collaboration, and unwavering commitment to strengthening agricultural education and workforce development in Nigeria. The Board is particularly grateful to the Tertiary Education Trust Fund (TETFund) for providing the special intervention grant that funded the nationwide skills gap analyses, stakeholder engagements, curriculum review exercises, validation meetings, and development workshops. The evidence generated through these studies provided a solid foundation for developing curricula that are relevant, industry-driven, and responsive to national and global agricultural priorities.

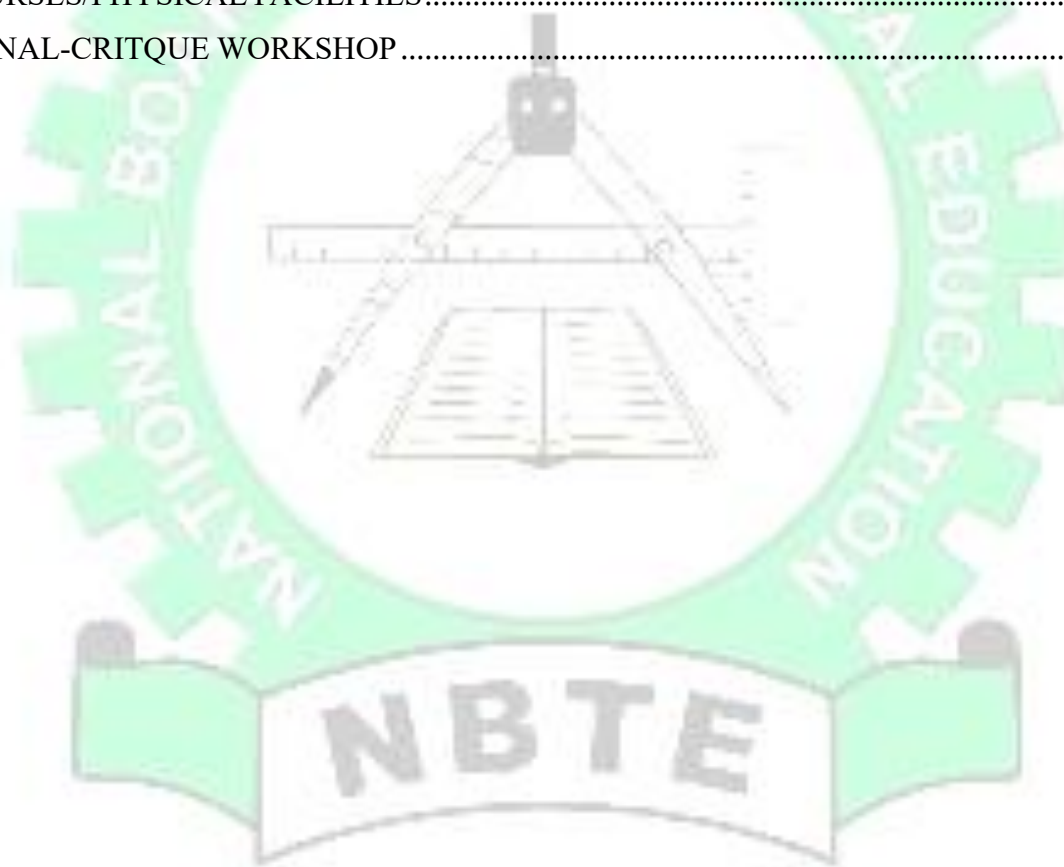
Special appreciation is extended to the curriculum specialists, resource persons, academic experts, professional bodies, regulatory agencies, employers, industry practitioners, development partners, and representatives of public and private sector organizations who participated actively in the skills gap studies, technical sessions, validation exercises, and curriculum development workshops. Their diverse expertise and practical insights greatly enriched the quality and relevance of the curricula. We further appreciate the support of the French Embassy in Nigeria and other development partners for their collaboration in promoting excellence and innovation in technical and vocational education within the agricultural sector. Finally, NBTE expresses its gratitude to all tertiary institutions, researchers, facilitators, rapporteurs, technical staff, and administrative personnel whose commitment and hard work contributed to the successful completion of this important national assignment. The Board acknowledges that this achievement is the result of a collective effort and remains confident that the effective implementation of these curricula will contribute significantly to producing competent, innovative, and entrepreneurial graduates capable of advancing sustainable agricultural development, food security, and economic prosperity in Nigeria.



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GENERAL INFORMATION

1.0 PROGRAMME NOMENCLATURE

Higher National Diploma (HND) in Organic Crop Production Technology

2.0 PROGRAMME GOAL

The Higher National Diploma in Organic Crop Production Technology programme is designed to produce competent technologists equipped with practical skills, scientific knowledge and professional competencies in sustainable organic crop production and certification using climate-smart, environment-friendly and technology-driven agricultural practices for safe food production, agribusiness development and environmental sustainability.

3.0 OBJECTIVES OF THE PROGRAMME

On completion of the programme, the diplomates should be able to:

- i. Apply organic crop production practices in cereals, legumes, oilseeds, root and tuber crops, fibre crops, horticultural crops, tree and plantation crops;
- ii. Apply knowledge of climate-smart, sustainable and regenerative agricultural practices in organic crop production systems;
- iii. Apply knowledge of organic soil fertility management, composting and biofertilizer production techniques for improved crop productivity;
- iv. Apply organic standards in seed production, crop establishment, irrigation and water conservation practices;
- v. Apply weed, pest and disease management techniques using approved organic methods;
- vi. Apply organic standards in greenhouse, protected cultivation and other controlled environment agricultural practices in organic crop production;
- vii. Apply organic standards in post-harvest handling, storage, processing, packaging and value addition practices;
- viii. Apply organic standards in quality assurance, certification, traceability and farm record keeping practices;
- ix. Apply knowledge of digital agriculture, farm mechanization, ICT tools and precision agriculture technologies in farm management;
- x. Apply knowledge of research, experimentation and data analysis techniques in organic crop production;
- xi. Apply knowledge of agribusiness, entrepreneurship, marketing and farm management practices in organic crop production;
- xii. Demonstrate practical competencies for employment, self-reliance and sustainable entrepreneurship in organic crop production system.

4.0 ENTRY REQUIREMENTS

The minimum entry requirements into the HND Organic Crop Production Technology programme are:

- i. Five (5) O'Level credits in relevant subjects including English Language, Mathematics, Agricultural Science or Biology, Chemistry and one other relevant subject;
- ii. National Diploma (ND) in Organic Agricultural Technology, Agricultural Technology, Crop Production, or related disciplines with at least Lower Credit;
- iii. At least one (1) year post-ND industrial training experience;

- iv. Candidates with pass grade in ND must have 2 years post ND cognate industrial training /experience before applying for HND in this programme;
- v. Candidates must satisfy institutional and any other approved admission requirements.

5.0 STRUCTURE/DURATION OF THE PROGRAMME

The programme is structured to last for **two (2) academic years (four semesters)** of classroom instruction, laboratory work, and field practicals. Each semester shall consist of:

- i. 15 contact weeks of teaching (lectures, practicals, fieldwork);
- ii. 2 weeks for tests, registration, and examinations.

6.0 CURRICULUM

The curriculum of the HND Organic Crop Production Technology programme consists of four (4) main components:

- i. General Studies Courses;
- ii. Foundation Courses;
- iii. Professional Courses;
- iv. Mantory skills qualification.

7.0 AWARD OF HIGHER NATIONAL DIPLOMA

The Higher National Diploma in Organic Crop Production Technology shall be awarded by the authority of the Academic Board of the institution. Conditions for the Award of HND include:

- i) Satisfactory performance in all prescribed course work/assignments, tests/quizzes, workshop practice, laboratory work, field work etc.
- ii) Satisfactory performance in all semester examinations.
- iii) Satisfactory completion of written project/seminar papers.

8.0 GRADING OF COURSES

Courses shall be graded as follows:

MARK RANGE	LETTER GRADE	WEIGHTING
75% and above	A	4.00
70% – 74%	AB	3.50
65% – 69%	B	3.25
60% – 64%	BC	3.00
55% – 59%	C	2.75

50% – 54%	CD	2.50
45% – 49%	D	2.25
40% – 44%	E	2.00
Below 40%	F	0.00

8.1 Classification of Diploma

Distinction	– CGPA 3.50 – 4.00
Upper Credit	– CGPA 3.00 – 3.49
Lower Credit	– CGPA 2.50 – 2.99
Pass	– CGPA 2.00 – 2.49

9.0 ACCREDITATION OF PROGRAMME

The Higher National Diploma (HND) in Organic Crop Production Technology programme shall be accredited by the National Board for Technical Education (NBTE) before diplomates can be awarded the qualification. Details about the process of accrediting a programme are available from the Board's website or through correspondence to:

The Executive Secretary
National Board for Technical Education (NBTE)
Plot 'B' Bida Road,
P.M.B 2239, Kaduna, Nigeria.

10.0 LOG BOOK

Students shall maintain a personal log book to record all practical activities carried out during:

- Field practicals
- Laboratory work
- Farm operations
- The log book shall be:
 - ✓ Checked regularly
 - ✓ Marked appropriately
 - ✓ Endorsed by lecturers

11.0 FINAL YEAR PROJECT

Students shall undertake a project work in the final year.

- The project may be individual or group-based (maximum of two students per group);
- The project must be relevant to Organic Crop Production Technology;

- The project shall be supervised and formally presented.

12.0 STAFFING REQUIREMENTS

12.1 Core Teaching Staff

The teaching staff should consist of minimum number of four (4) qualified lecturers with atleast HND or BSc in the following disciplines: Crop Production; Agronomy; Soil Science; Agricultural Engineering and other related disciplines.

12.2 Head of Department (HOD)

The Head of Department shall possess relevant academic qualifications and not below the rank of a Senior Lecturer.

12.3 Technical Staff

These are technically qualified staff not involved in direct lecturing/instructing, but who provide vital and indispensable services in laboratories, workshops, studios, use of machinery and equipment, farms and other field facilities. All major laboratories/workshops etc should be under the supervision of technologists who should possess HND or equivalent qualification. Smaller laboratories and facilities where applicable should be manned by technicians who should possess ND or equivalent qualification. They should be under the supervision of a technologist. Assistants/attendants should be attached to each facility to ensure its proper upkeep.

13.0 CERTIFICATION

A diplomate of this programme shall be awarded:

Higher National Diploma (HND) in Organic Crop Production Technology

14.0 GUIDANCE NOTES FOR TEACHERS OF THE PROGRAMME

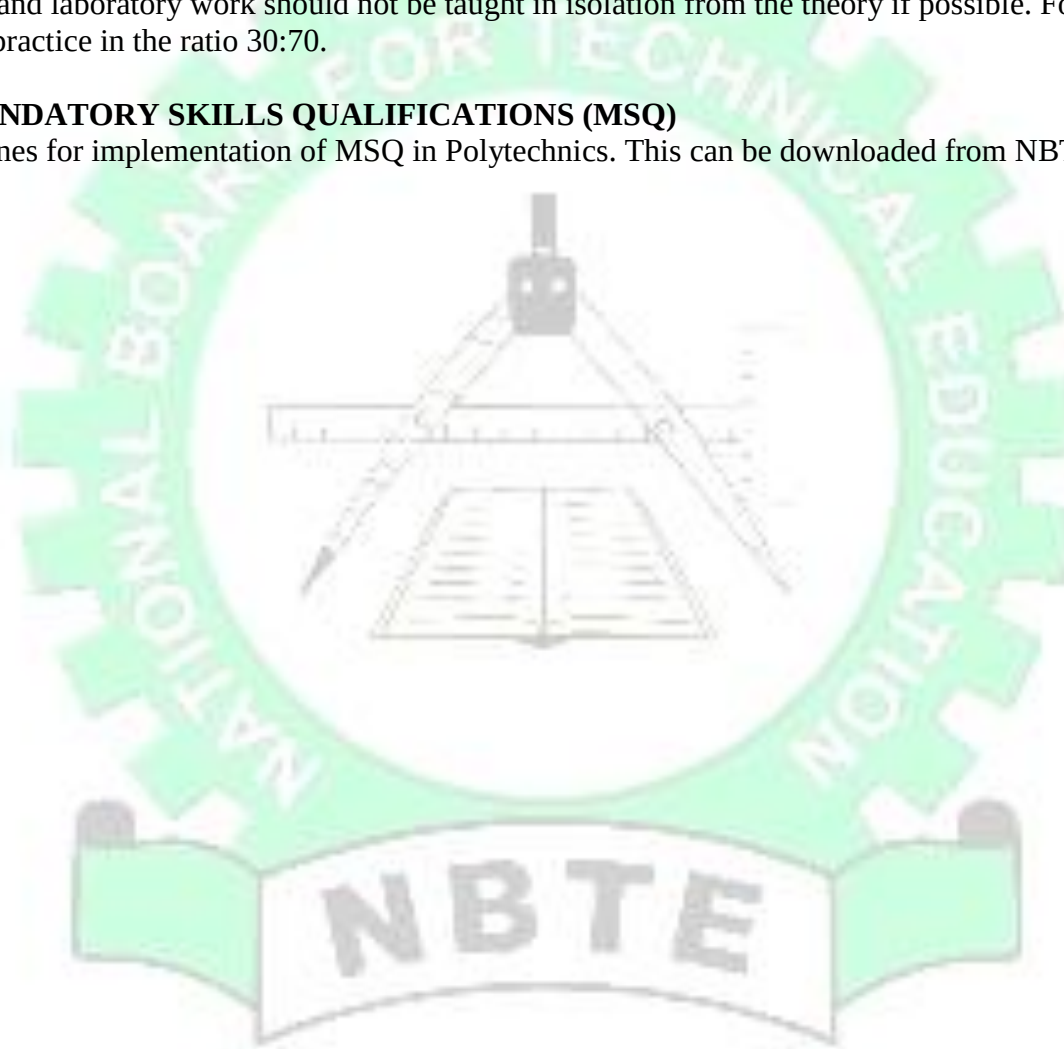
- 14.1 The new curriculum is drawn in unit courses. This is keeping with the provisions of the National Policy on education which stress the need to introduce the semester credit units which will enable a student who so wish to transfer the units already completed in an institution of similar standard from which he is transferring.
- 14.2 In designing the units, the principles of the modular system by product has been adopted; thus making each of the professional modules, when completed provide the students with technician operative skills, which can be used for employment purposes.
- 14.3 As the success of the credit unit system depends on the articulation of programmes between the institutions and industry, the curriculum content has been written in the behavioral objectives, so that is clear to all, the special Learning objective of the student who successfully completed some of the courses or the diplomates of the programme. There is a slight departure in the presentation of the performance based curriculum which state categorically, the special learning objective for the students, also, there is a deliberate attempt to further involve the staff of the department teaching by having another column called Teaching activities. This is to ensure that the lecturers deliver the required learning objectives. There is a third column for the Resources required for each learning objective. Each department is expected to develop its own curriculum to facilitate learning from this minimum Guide curriculum and ensure that

the resources required are available. The Academic Board of the institution may vet departmental submission on the final curriculum. Our aim is to continue to see to it that a solid internal evaluation system exists in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the TVET Institutions.

- 14.4 The teaching of the theory and practical work should, as much as possible, be integrated. Practical exercises, especially those in professional courses and laboratory work should not be taught in isolation from the theory if possible. For each course, there should be a balance of theory to practice in the ratio 30:70.

15.0 GUIDELINES ON MANDATORY SKILLS QUALIFICATIONS (MSQ)

Please, refer to NBTE guidelines for implementation of MSQ in Polytechnics. This can be downloaded from NBTE website (www.nbte.edu.ng)



CURRICULUM TABLE**YEAR ONE, SEMESTER ONE**

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	GNS 301	Communication in English III	2	0	0	2	2
2.	MSQ 311	Principles of Quality Assurance Assessment	1	0	1	2	2
3.	CPT 313	Agro-Climatology & Climate-Smart Agriculture	1	0	2	3	3
4.	CPT 314	Cropping Systems & Sustainable Intensification	1	0	2	3	3
5.	CPT 312	Crop Physiology	1	0	2	3	3
6.	CPT 318	Agricultural Biochemistry	1	0	2	3	3
7.	OCP 311	Organic Crop Production I (Cereals, Legumes and Oilseeds)	1	0	2	3	3
8.	OCP 312	Soil Fertility and Nutrient Management in Organic System	1	0	2	3	3
9.	OCP 313	Composting Technology and Biofertilizer Production	1	0	1	2	2
10.	OCP 314	Organic Seed Production	1	0	1	2	2
11.	OCP 315	Weed Management in Organic Crop Production	1	0	1	2	2
TOTAL			12	0	16	28	28

YEAR ONE, SEMESTER TWO

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	ENT 326	Practice of Entrepreneurship I	2	0	2	4	4
2.	MSQ 321	Practice of Quality Assurance Assessment	1	0	1	2	2
3.	AEM 314	Extension Methods and Digital Advisory Services	2	0	2	4	4
4.	AGR 302	Field Experimentation and Data Analysis	1	0	2	3	3
5.	AGR 303	Farm Management	1	0	1	2	2
6.	CPT 325	Digital Agriculture and Computer Application	1	0	2	3	3
7.	OCP 321	Organic Crops Production II (Root, Tubers, Fiber and Others)	1	0	1	2	2
8.	OCP 322	Irrigation and Water Conservation Systems in Organic Crop Production	1	0	1	2	2
9.	OCP 323	Plant Health and Disease Diagnostics in Organic System	1	0	1	2	2
10.	OCP 324	Organic Horticultural Crop Production	1	0	1	2	2
11.	OCP 325	Field Practical I (Organic Crop Production Trials and Demonstration Plots)	0	0	2	2	2
TOTAL			12	0	16	28	28

YEAR TWO, SEMESTER ONE

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	ENT 416	Practice of Entrepreneurship II	2	0	2	4	4
2.	AGR 401	Research Methodology and Scientific Writing	2	0	0	2	2
3.	CPT 436	Farm Mechanization and Precision Agriculture Technology	1	0	3	4	4
4.	OCP 411	Organic Crops Production III (Tree and Plantation Crops)	1	0	2	3	3
5.	OCP 412	Pest and Disease Control in Organic System	1	0	2	3	3
6.	OCP 413	Greenhouse and Protected Crop Production in Organic System	1	0	2	3	3
7.	OCP 414	Organic Pasture and Forage Production	1	0	1	2	2
8.	OCP 415	Agroecology and Sustainable Farming Systems	1	0	2	3	3
9.	OCP 416	Field Practical II: Organic Crop Monitoring and Certification Compliance	0	0	3	3	3
TOTAL			10	0	17	27	27

YEAR TWO, SEMESTER TWO

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	OCP 421	Organic Food Safety, Quality Assurance and Export Standards	1	0	2	3	3
2.	OCP 422	Organic Produce Processing, Packaging and Value Addition	1	0	2	3	3
3.	OCP 423	Urban Organic Farming and Controlled Environment Agriculture	1	0	2	3	3
4.	OCP 424	Farm Waste Recycling and Circular Bioeconomy Systems	1	0	2	3	3
5.	OCP 425	Post-Harvest Handling and Storage in Organic System	1	0	3	4	4
6.	OCP 426	Organic Standards, Certification and Traceability	1	0	2	3	3
7.	OCP 427	Regenerative Agriculture and Biodiversity Conservation	1	0	2	3	3
8.	OCP 428	Seminar	0	0	1	1	1
9.	OCP 429	Project	0	0	4	4	4
TOTAL			7	0	20	27	27



ORGANIC CROP PRODUCTION I (CEREALS, LEGUMES AND OILSEEDS)

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC CROP PRODUCTION I (CEREALS, LEGUMES AND OILSEEDS)	COURSE CODE: OCP 311	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and skills in cereal, legume/pulses and oilseed crop production using sustainable, climate-smart and environment friendly production technologies for improved productivity and soil health.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the origin, classification, characteristics, organic production and importance of cereal crops; 2.0 Understand the origin, classification, characteristics, organic production and importance of legume/pulses crops; 3.0 Appreciate the origin, classification, characteristics, organic production and importance of oilseed crops; 4.0 Know post-harvest, handling, storage and marketing of cereal, legume and oilseed crops in organic system; 5.0 Know climate-smart practices and record keeping in cereal, legume/pulses and oilseed crops in organic system.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC CROP PRODUCTION I (CEREALS, LEGUMES AND OILSEEDS)		COURSE CODE: OCP 311		CONTACT HOURS: 3 HOURS/WEEK		
		CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK		
YEAR: I SEMESTER: I		PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills in cereal, legume/pulses and oilseed crop production using sustainable, climate-smart and environment friendly production technologies for improved productivity and soil health.						
GENERAL OBJECTIVE1.0: Understand the origin, classification, characteristics, organic production and importance of cereal crops.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Explain the origin of cereal crops e.g maize, sorghum, rice etc. 1.2 Explain the Classification of cereal crops based on use and morphological characteristics. 1.3 Describe botanical characteristics of cereals. 1.4 Discuss organic production and field management practices of cereal crops 1.5 Discuss economic and nutritional importance of cereal crops.	- Discuss the origin of cereal crops e.g maize, sorghum, rice etc. - Explain cereal crops based on use and morphological characteristics. - Describe botanical characteristics of cereals. - Explain organic production and	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos etc.	- Identify major cereal crops grown locally. - Classify cereal crops according to use and crop morphology. - Observe botanical characteristics of selected cereal crops. - Prepare crop identification records and herbarium	Guide Student to: - Identify cereal crops. - Classify cereal crops. - Carryout organic production of some selected cereal crops using modern technologies - Field trip to a model farm (s).	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks smartphones, PPE, practical manual and harvesters etc.

		field management practices of cereal crops • Explain economic and nutritional importance of cereal crops.		samples. • Carry out organic production of some selected cereal crops using modern technologies • Prepare field production records		
General Objective 2.0: Understand the origin, classification, characteristics, organic production and importance of legume/pulses crops.						
4-6	2.1 Explain the origin of legume crops e.g cowpea, soyabeans, groundnut etc. 2.2 Explain the classification of legume crops based on use and morphological characteristics. 2.3 Discuss botanical characteristics of legumes. 2.4 Discuss organic production and field management practices of legume crops. 2.5 Discuss economic and nutritional importance of legume crops.	• Discuss the origin of legume crops e.g cowpea, soyabeans, groundnut etc. • Describe legume crops based on use and morphological characteristics. • Describe botanical characteristics of legumes. • Explain organic production and field	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos etc.	• Identify major legume crops grown locally. • Classify legume crops according to use and morphological characteristics. • Observe botanical characteristics of selected legume crops. • Prepare crop identification records and herbarium samples.	Guide Students to: • Identify major legume crops grown locally. • Classify legume crops according to use and morphological characteristics. • Observe botanical characteristics of selected legume crops. • Prepare crop identification records and	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks, smartphones, PPE, practical manual, harvesters, thrashers, silos, storage basins, bags, rhumbus

		- management practices of legume crops - Explain economic and nutritional importance of legume crops.		- Carry out organic production of some selected legume crops using modern technologies - Prepare field production records	- herbarium samples. - Carry out organic production of some selected legume crops - Prepare field production records	and cribs etc.
General Objective 3.0: Understand the origin, classification, characteristics, organic production and importance of oilseed crops.						
7-9	3.1 Explain the origin of oilseeds e.g sesame, sunflower, melon, etc. 3.2 State the classification of oilseeds based on use and morphological characteristics. 3.3 Explain botanical characteristics of oilseeds 3.4 Discuss organic production and field management practices of oilseeds. 3.5 Discuss economic and nutritional importance of oilseeds.	- Discuss the origin of oilseeds e.g sesame, sunflower, melon, etc. - Describe oilseeds based on use and morphological characteristics. - Describe botanical characteristics of oilseeds. - Explain organic production and field management practices of oilseeds	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos etc.	- Identify major oilseeds grown locally. - Classify oilseeds according to use and morphological characteristics. - Observe botanical characteristics of selected oilseeds. - Prepare crop identification records and herbarium samples.	Guide Students to: - Identify major oilseeds grown locally. - Classify oilseeds according to use and morphological characteristics. - Observe botanical characteristics of selected oilseeds. - Prepare crop identification records and	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks, smartphones, PPE, practical manual harvesters, thrashers, silos, storage basins, bags, rhombus

		Explain economic and nutritional importance of oilseeds.		- Carry out organic production of some selected oilseeds using modern technologies. - Prepare field production records	herbarium samples. - Carry out organic production of some selected oilseeds using modern technologies. - Prepare field production records	and cribs etc.
General Objective 4.0: Know post-harvest, handling, storage and marketing of cereal, legume and oilseed crops in organic system.						
10-12	4.1 Explain crop maturity indices for cereal, legume and oilseed crops. 4.2 Describe harvesting methods and equipment in cereals, legumes and oilseeds production. 4.3 Explain handling, sorting and grading in cereals, legumes and oilseeds production in organic system. 4.4 Explain packaging and storage in cereals, legumes and oilseeds production in organic system. 4.5 Describe primary processing for each crop group in organic system. 4.6 Discuss marketing in cereals, legumes and oilseeds production	- Discuss crop maturity indices for cereal, legume and oilseed crops - Explain harvesting methods and equipment in cereals, legumes and oilseeds production - Describe handling, sorting and grading in cereals, legumes and oilseeds production in organic system - Describe	White/Smart boards, markers, textbooks, journals, internet, charts, projector, pest identification manuals, videos etc.	- Identify maturity indices in cereal, legume and oilseed crops - Identify harvesting equipment in cereal, legume and oilseed crops - Carry out harvesting and handling of	Guide students to: - Identify maturity indices in cereal, legume and oilseed crops - Identify harvesting equipment in cereal, legume and oilseed crops - Carry out harvesting and	Threshers, storage bins, dryers, organic storage inputs, sprayers, Silo, warehouse, drying slabs, Smartphones PPE, practical manual, Harvesting tools, scales, grading tables, moisture meter, hermetic bags, open sacks, etc.

		packaging and storage in cereals, legumes and oilseeds production in organic system • Explain primary processing for each crop group • Explain marketing in cereals, legumes and oilseeds production in organic system		cereal, legume and oilseed crops in organic system. • Carry out sorting and grading • Carry out threshing, winnowing and other processing operations in organic system. • Determine moisture content of selected crops before storage • Carry out packaging and storage of cereal, legume and oilseed crops in organic system.	handling of cereal, legume and oilseed crops in organic system. • Carry out sorting and grading • Carry out threshing, winnowing and other processing operations in organic system. • Determine moisture content of selected crops before storage • Carry out packaging and storage of cereal, legume and oilseed crops in organic	
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				• Undertake market survey of cereal, legume and oilseed crops • Keep records of all the operations manually and digitally	• Undertake market survey of cereal, legume and oilseed crops • Keep records of all the operations manually and digitally	
General Objective 5.0: Know the climate-smart practices and record keeping in cereal, legume/pulses and oilseed crops in organic system.						
13-15	5.1 Explain the climate-smart agricultural practices in cereals, legumes and oilseed production. 5.2 Discuss effects of climate change on cereals, legumes and oilseeds production. 5.3 Explain climate risk adaptation practices in field crop production. 5.4 Explain farm record keeping in cereals, legumes and oilseeds production.	• Discuss climate-smart crop production using local farming examples. • Explain climate change effects on cereals, legumes and oilseeds	White/smart boards, markers, textbooks, journals, internet, climate-smart agriculture manuals, annual NIMET reports, charts, projector,	• Carry out climate-smart demonstration for selected crops on already established plot. • Practice water-efficient irrigation	Guide students to: • Carry out climate-smart demonstration for selected crops on already established plot. • Practice water-efficient	GPS, Sensors, drones, robots, computer, irrigation materials, field plots, smartphones, weather apps, notebooks, farm record sheets, PPE, practical manual, crop production records etc.

		production. • Discuss farm documentation and record keeping procedures. • Describe use of climate information for farm decision-making.	videos, weather reports, farm record templates etc.	and watering methods where applicable. • Interpret weather information using smartphone weather applications . • Prepare climate-based planting calendar for selected crops. • Keep farm records on planting date, weather condition, input use and crop performance.	irrigation and watering methods where applicable. • Interpret weather information using smartphone weather applications • Prepare climate-based planting calendar for selected crops. • Keep farm records on planting date, weather condition, input use and crop performance.	
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			Practice farm documentation for cereals, legumes and oilseed production.	Practice farm documentation for cereals, legumes and oilseed production.	
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%					

SOIL FERTILITY AND NUTRIENT MANAGEMENT IN ORGANIC SYSTEM

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: SOIL FERTILITY AND NUTRIENT MANAGEMENT IN ORGANIC SYSTEM	COURSE CODE: OCP 312	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and skills in maintaining soil fertility and nutrient management using organic, climate-smart and sustainable agricultural practices.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand the principles of soil fertility and soil health in organic crop production; 2.0 Understand the organic nutrient sources and soil amendment materials; 3.0 Understand soil fertility improvement and nutrient conservation practices; 4.0 Understand the nutrient deficiency symptoms and nutrient management practices in crops; 5.0 Understand fertilizer formulation and calculation.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY							
COURSE TITLE: SOIL FERTILITY AND NUTRIENT MANAGEMENT IN ORGANIC SYSTEM			COURSE CODE: OCP 312		CONTACT HOURS: 3 HOURS/WEEK		
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK		
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL							
GOAL: This course is designed to equip students with knowledge and skills in maintaining soil fertility and nutrient management using organic, climate-smart and sustainable agricultural practices.							
GENERAL OBJECTIVE 1.0: Understand the principles of soil fertility and soil health in organic crop production							
THEORETICAL CONTENT				PRACTICAL CONTENT			
Week	Specific Learning Outcome		Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1	Explain soil fertility and soil health.	• Explain soil fertility concepts using local soil examples. • Discuss importance of soil organisms in crop production. • Demonstrate soil properties using practical examples. • Engage students through questioning and	Textbooks, journals, internet, articles, projector, charts, marker board, marker, videos, soil samples etc.	• Identify different soil types and soil organisms. • Carry out simple field assessment of soil texture, colour and moisture. • Collect soil samples from different locations. • Observe soil organisms and their activities in soil. • Maintain records of soil observations.	Guide students to: • Identify different soil types and soil organisms. • Carry out simple field assessment of soil texture, colour and moisture. • Collect soil samples from different locations. • Observe soil	Soil samples, soil auger, shovel, hand trowel, sample containers, field notebook, practical manual etc.
	1.2	Discuss the importance of soil fertility in organic crop production.					
	1.3	Explain physical, chemical and biological properties of soil.					
	1.4	Describe soil organisms and their importance in soil fertility.					

		discussion.			organisms and their activities in soil. • Maintain records of soil observations.	
General Objective 2.0: Understand the organic nutrient sources and soil amendment						
4-6	2.1 Explain organic nutrient sources used in crop production. 2.2 Discuss organic fertilizers and soil amendment materials. 2.3 Explain the importance of compost, manure and biofertilizers in soil fertility management. 2.4 Identify locally available organic nutrient materials.	• Discuss nutrient sources using practical examples. • Display organic nutrient materials and discuss their uses. • Discuss locally available soil amendment materials.	Textbooks, journals, internet, compost samples, manure, charts, videos, projector etc.	• Identify organic fertilizers and soil amendment materials. • Classify organic nutrient materials according to use. • Collect locally available nutrient materials. • Practice safe handling of liquid and solid manure. • Prepare simple liquid and solid manure mixture for field use. • Maintain inventory of organic nutrient materials.	Guide students to: • Identify organic fertilizers and soil amendment materials. • Classify organic nutrient materials according to use. • Collect locally available nutrient materials. • Practice safe handling of liquid and solid manure. • Prepare simple liquid and solid manure mixture for field use. • Maintain inventory of organic nutrient materials.	Compost, manure, wheelbarrow, shovel, gloves, PPE, farm tools, practical manual etc.
General Objective 3.0: Understand soil fertility improvement and nutrient conservation practices						

7-9	3.1 Explain soil fertility improvement practices. Discuss mulching, cover cropping and green manuring practices. 3.2 Discuss crop rotation and nutrient recycling practices. 3.3 Explain nutrient conservation 3.4 Explain practices in organic farming. 3.5 Describe soil erosion control practices	• Discuss soil fertility improvement practices. • Explain mulching, cover cropping and green manuring practices. • Describe crop rotation and nutrient recycling. • Discuss nutrient conservation practices in organic farming. • Discuss cover cropping and erosion control practices.	Textbooks, journals, internet, charts, projector, videos, manuals etc.	• Apply mulching materials on field plots. • Carry out simple cover cropping practices. • Establish green manure demonstration plot. • Practice crop rotation planning for soil fertility management. • Carry out nutrient recycling activities using farm residues. • Practice nutrient conservation methods on field plots. • Carry out simple erosion control practices. • Maintain soil fertility demonstration plots.	Guide students to: • Apply mulching materials on field plots. • Carry out simple cover cropping practices. • Establish green manure demonstration plot. • Practice crop rotation planning for soil fertility management. • Carry out nutrient recycling activities using farm residues. • Practice nutrient conservation methods on field plots.	Mulching materials, watering cans, hoe, rake, field plots, farm tools, practical manual etc.
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					• Carry out simple erosion control practices. • Maintain soil fertility demonstration plots.	
General Objective 4.0: Understand the nutrient deficiency symptoms and nutrient management practices in crops						
10-12	4.1 Explain essential plant nutrients and their functions. 4.2 Describe nutrient deficiency symptoms in crops. 4.3 Discuss nutrient management practices in organic crop production. 4.4 Explain methods of nutrient application in organic farming. 4.5 Explain the importance and implication of soil nutrient analysis 4.6 Explain Nutrient application rates	• Describe nutrient functions and deficiency symptoms using charts and crop samples. • Discuss organic nutrient management practices. • Describe nutrient application methods and rates. • Discuss the importance and implication of soil nutrient analysis	Nutrient charts, crop samples, journals, videos, projector etc.	• Identify nutrient deficiency symptoms in crops. • Carry out field observation of nutrient deficiency signs. • Apply organic nutrient materials on demonstration plots at the recommended rates. • Practice different methods of organic nutrient application. • Carry out routine soil nutrient analysis • Maintain nutrient	Guide students to: • Identify nutrient deficiency symptoms in crops. • Carry out field observation of nutrient deficiency signs. • Apply organic nutrient materials on demonstration plots at the recommended rates. • Practice different methods of organic nutrient	Crop samples, nutrient charts, compost, manure, watering cans, field plots, practical manual etc.

				application records.	• Carryout routine soil nutrient analysis • Maintain nutrient application records.	
General Objective 5.0: Understand fertilizer and bio-stimulants formulation and calculation						
13-15	5.1 Describe the various types of organic fertilizers and bio-stimulants 5.2 Explain various fertilizer formulations 5.3 Explain fertilizer calculations 5.4 List recommended rates of fertilizers	• Discuss the various types of organic fertilizers and bio-stimulants • Discuss various fertilizer formulations and bio-stimulants • Explain fertilizer calculations and bio-stimulants • Explain recommended rates of fertilizers and bio-stimulants	Textbooks, journals, internet, videos, charts, projector etc.	• Identify various organic fertilizers and bio-stimulants • Carry out organic fertilizer calculations for a specified area of land • Carry out formulation of organic fertilizers and bio-stimulants	Guide students to: • Identify various organic fertilizers and bio-stimulants • Carry out organic fertilizer calculations for a specified area of land • Carry out formulation of organic fertilizers and bio-stimulants	Organic fertilizers (Farm yard manure, neem seed cake, poultry manure etc.), Land measuring tools/machines, weighing scales, notebooks, farm records, practical manual etc.

COURSE ASSESSMENT:

Course Work: 10%

Test/Assignments: 10%

Practical: 40%

Examination: 40%

Total: 100%



COMPOSTING TECHNOLOGY AND BIOFERTILIZER PRODUCTION

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: COMPOSTING TECHNOLOGY AND BIOFERTILIZER PRODUCTION	COURSE CODE: OCP 313	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in composting technology, biofertilizer production and organic waste utilization for sustainable soil fertility management in organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the principles and importance of composting technology; 2.0 Know composting materials and compost preparation methods; 3.0 Understand compost management and maturity assessment practices; 4.0 Know biofertilizer production and utilization practices; 5.0 Know safety and quality management in compost and biofertilizer production.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: COMPOSTING TECHNOLOGY AND BIOFERTILIZER PRODUCTION		COURSE CODE: OCP 313			CONTACT HOURS: 2 HOURS/WEEK	
		CREDIT UNIT: 2			THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: I		PRE-REQUISITE:			PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in composting technology, biofertilizer production and organic waste utilization for sustainable soil fertility management in organic crop production.						
GENERAL OBJECTIVE 1.0: Understand the principles and importance of composting technology						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Explain composting technology. 1.2 Explain the importance of composting in organic crop production. 1.3 Enumerate the benefits of composting in soil fertility improvement. 1.4 Describe common composting methods.	- Explain composting technology. - Explain the importance of composting in organic crop production. - Discuss the benefits of composting in soil fertility improvement. - Discuss common composting	Textbooks, journals, internet, articles, projector, charts, white board, marker, videos etc.	- Visit demonstration plots where compost manure is used to fertilize crops - Observe the use of compost manure in organic crop production - Report the visual effects of compost on the crops	Guide students to: - Visit demonstration plots where compost manure is used to fertilize crops - Observe the use of compost manure in organic crop production - Report the visual effects	Demonstration plots, practical manuals etc.

		methods.			of compost on the crops	
General Objective 2.0: Know composting materials and compost preparation methods						
4-7	2.1 Explain composting materials used in organic farming. 2.2 Explain compost preparation methods. 2.3 Explain compost pit, heap and bin methods. 2.4 Outline factors affecting composting process. 2.5 Explain compost tea production and uses	• Explain composting materials used in organic farming. • Explain compost preparation methods. • Explain compost pit, heap and bin methods. • Explain factors affecting composting process. • Explain compost tea production and uses	Textbooks, journals, internet, videos, charts, projector etc.	• Collect locally available compost materials. • Carry out compost material sorting and mixing. • Establish compost pit, heap or compost bin. • Practice layering of compost materials. • Apply water to compost materials appropriately. • Carry out compost tea production • Maintain compost preparation records.	Guide students to: • Collect locally available compost materials. • Carry out compost material sorting and mixing. • Establish compost pit, heap or compost bin. • Practice layering of compost materials. • Apply water to compost materials appropriately • Carry out compost tea production • Maintain	Compost materials, manure, shovel, rake, watering can, wheelbarrow, PPE, compost pit area, compost demonstration plots, practical manual, thermometer etc.

					compost preparation records.	
General Objective 3.0: Understand compost management and maturity assessment practices						
8-11	3.1 Explain compost management practices. 3.2 Explain compost maturity indicators. 3.3 List the factors affecting compost quality. 3.4 Describe storage and handling of compost.	• Explain compost management practices. • Explain compost maturity indicators. • Explain the factors affecting compost quality. • Explain storage and handling of compost	Charts, journals, videos, projector etc.	• Carry out compost turning operations. • Monitor compost moisture condition. • Assess compost maturity using colour, smell and texture. • Practice compost storage and handling. • Maintain compost monitoring records.	Guide students to: • Carry out compost turning operations. • Monitor compost moisture condition. • Assess compost maturity using colour, smell and texture. • Practice compost storage and handling. • Maintain compost monitoring records.	Compost pit/heap, shovel, gloves, moisture containers, thermometer, farm tools, practical manual etc.
General Objective 4.0: Know biofertilizer production and utilization practices						

12-15	4.1 Explain biofertilizers and their importance in organic crop production. 4.2 List types of biofertilizers. 4.3 Explain methods of biofertilizer application. 4.4 Explain storage and handling of biofertilizers.	• Explain biofertilizers and their importance in organic crop production. • Discuss types of biofertilizers. • Explain methods of biofertilizer application. • Explain storage and handling of biofertilizers.	Textbooks, journals, internet, samples of biofertilizers, charts, videos, projector etc.	• Identify common biofertilizer materials. • Prepare simple liquid/solid biofertilizer. • Practice biofertilizer application on demonstration plots. • Carry out safe handling and storage of biofertilizers. • Maintain simple biofertilizer production records.	Guide students to: • Identify common biofertilizer materials. • Prepare simple liquid/solid biofertilizer. • Practice biofertilizer application on demonstration plots. • Carry out safe handling and storage of biofertilizers • Maintain simple biofertilizer production records.	Containers, drums, organic materials, watering cans, field plots, biofertilizers, PPE, practical manual etc.
General Objective 5.0: Know safety and quality management in compost and biofertilizer production						
13-15	5.1 Explain safety measures in compost production. 5.2 Explain sanitation and hygiene in biofertilizer production	• Explain safety measures in compost production. • Explain	Textbooks, journals, internet, safety charts, videos etc.	• Practice safe handling of compost. • Carry out sanitation and hygiene in	Guide students to: • Practice safe handling of compost. • Carry out	PPE, gloves, sanitation materials, compost samples,

	5.3 Explain quality control in compost production.	sanitation and hygiene in biofertilizer production • Discuss quality control in compost production.		biofertilizer handling. • Assess compost quality using basic indicators. • Maintain simple safety and sanitation records.	sanitation and hygiene in biofertilizer handling. • Assess compost quality using basic indicators. • Maintain simple safety and sanitation records.	record sheets, practical manual etc.
Course Assessment: Course Work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% Total: 100%						

ORGANIC SEED PRODUCTION

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC SEED PRODUCTION	COURSE CODE: OCP 314	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in organic seed production, seed handling and planting material management for sustainable and profitable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Know organic seed systems and seed quality requirements; 2.0 Know seed selection, testing and handling practices in organic system; 3.0 Know nursery establishment and seedling management practices; 4.0 Know vegetative planting materials and crop establishment practices; 5.0 Know storage and record keeping practices for seeds and planting materials.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC SEED PRODUCTION		COURSE CODE: OCP 314			CONTACT HOURS: 2 HOURS/WEEK	
		CREDIT UNIT: 2			THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: I		PRE-REQUISITE:			PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in organic seed production, seed handling and planting material management for sustainable and profitable organic crop production.						
GENERAL OBJECTIVE 1.0: Know organic seed systems and seed quality requirements						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Explain organic seed systems and their importance in crop production. 1.2 Describe characteristics of quality seeds and planting materials. 1.3 Describe seed purity, viability and germination concepts. 1.4 Describe sources of seeds and planting materials used in organic farming. 1.5 Explain the techniques of rapid and mass multiplication through tissue culture 1.6 Explain seed certification	- Explain organic seed systems and their importance in crop production. - Discuss characteristics of quality seeds and planting materials. - Describe seed purity, viability and germination concepts. - Describe sources of seeds and planting materials used in organic	Textbooks, journals, internet, projector, charts, white/smart board, marker, seed samples, videos, etc.	- Identify quality and poor-quality seeds. - Classify seeds according to seed class. - Carry out sorting and grading of seeds based on size and quality. - Practice seed cleaning and selection. - Visit a well-established tissue culture laboratory - Carry out simple	Guide students to: - Identify quality and poor-quality seeds. - Classify seeds according to seed class. - Sort and grade seeds based on size and quality. - Practice seed cleaning and selection. - Visit to	Seed samples, trays, hand lens, seed packets, labels, notebooks, storage containers, audio visual, practical manual, PPE, Smart phones, etc.

	and quality assurance practices in organic system	farming. • Explain the techniques of rapid and mass multiplication through tissue culture • Explain seed certification and quality assurance practices in organic system		mass multiplication of seedlings through tissue culture • Package seeds for labelling, storage and planting. • Prepare simple seed identification and handling records.	established tissue culture lab • Carry out simple mass multiplication of seedlings through tissue culture • Package and label seeds for storage and planting. • Prepare simple seed identification and handling records.	
General Objective 2.0: Know seed selection, testing and handling practices in organic system						
4-6	2.1 Explain seed selection practices in organic crop production. 2.2 Discuss seed viability and germination testing methods. 2.3 Explain organic seed treatment methods. 2.4 Describe seed handling and planting preparation practices. 2.5 Explain factors affecting	• Discuss seed selection practices in organic crop • Describe seed testing and treatment methods using practical examples. • Discuss germination factors and seed quality	Textbooks, journals, internet, charts, white/smart boards, markers, projector, videos, etc.	• Select quality seeds for planting. • Carry out simple seed viability and germination tests. • Practice organic seed treatment methods. • Prepare seeds for planting. • Record	Guide students to: • Select quality seeds for planting. • Carry out simple seed viability and germination tests. • Practice organic seed	Seed trays/boxes, sand, germination paper, containers, organic seed dressing organic materials, seed petri dish,

	seed germination and establishment.	Describe seed handling and planting preparation procedures. Discuss the factors affecting seed germination and establishment.		germination percentage and observations. • Prepare seed handling records.	treatment methods. • Prepare seeds for planting. • Record germination percentage and observations • Prepare seed handling records.	microscope, water, seed samples, filter paper, dishes, PPE, practical manual, Smart phones, etc.
General Objective 3.0: Know nursery establishment and seedling management practices						
7-9	3.1 Describe the different types of nurseries 3.2 Explain nursery establishment practices. 3.3 Describe organic methods of breaking seed dormancy 3.4 Explain nursery media and seed bed preparation. 3.5 Explain watering, shading and seedling care practices. 3.6 Describe common nursery problems and management practices. 3.7 Explain seedling hardening and transplanting	• Explain the different types of nurseries • Explain nursery establishment practices. • Explain organic methods of breaking seed dormancy • Discuss nursery media and seed bed	Textbooks, journals, internet, videos, charts, projector, etc.	• Carry out nursery bed preparation. • Prepare nursery media using organic materials. • Identify crops that exhibit seed dormancy • Carry out different methods of breaking seed dormancy • Sow seeds in nursery trays or beds.	Guide students to: • Carry out nursery bed preparation. Prepare nursery media using organic materials. • Identify crops that exhibit seed dormancy • Carry out different methods of	Nursery/ cell trays, watering cans, shade materials, sand, top soil, cow dung, peat, bio-fungicides, bio and organic fertilizers etc. media, seedlings,

	principles.	preparation. • Explain watering, shading and seedling care practices. • Describe common nursery problems and management practices. • Explain seedling hardening and transplanting principles.		• Practice watering and shading of seedlings. • Carry out seedling thinning and maintenance. • Practice seedling hardening before transplanting. • Prepare nursery management records.	breaking seed dormancy • Sow seeds in nursery trays or beds. • Practice watering and shading of seedlings. • Carry out seedling thinning and maintenance. • Practice seedling hardening before transplanting. • Prepare nursery management records.	farm tools, practical manual, Smart phone, PPE, etc.
General Objective 4.0: Know vegetative planting materials and crop establishment practices.						
10-12	4.1 Explain vegetative planting materials used in crop production. 4.2 Explain crop establishment methods in organic system	• Explain vegetative planting materials used in crop production.	Textbooks, journals, internet, charts, projector,	• Identify vegetative planting materials such as cuttings, suckers and tubers etc.	Guide students to: • Identify vegetative planting materials such as	Cuttings, tubers, suckers, seedlings, measuring

	4.3 Explain transplanting practices and field establishment. 4.4 Describe factors affecting crop establishment. 4.5 Explain spacing and planting depth requirements.	• Discuss crop establishment methods in organic system • Explain transplanting practices and field establishment. • Describe factors affecting crop establishment. • Explain spacing and planting depth requirements.	videos, etc.	• Prepare vegetative planting materials for planting. • Carry out land marking and spacing layout. Prepare planting holes, ridges or beds. • Carry out transplanting operations on field plots. Practice correct spacing and planting depth. • Prepare field establishment records.	cuttings, suckers and tubers etc. • Prepare vegetative planting materials for planting. • Carry out land marking and spacing layout. Prepare planting holes, ridges or beds. • Carry out transplanting operations on field plots. Practice correct spacing and planting depth. • Prepare field establishment records.	tape, ropes, pegs, hoe, field plots, practical manual, Smart phones, PPE, etc.
General Objective 5.0: Know storage and record keeping practices for seeds and planting materials						
13-15	5.1 Explain seed storage practices. 5.2 Describe storage conditions for seed and	• Explain seed storage practices. • Discuss storage conditions for	Storage charts, journals, internet, videos,	• Carry out sorting and storage of seeds and other planting materials.	Guide students to: • Carry out sorting and storage of seeds and other	Storage containers, seed packets, labels, record

	other planting materials. 5.3 Explain farm record keeping for seeds and other planting materials. 5.4 Describe common storage problems seeds and other planting materials, and their preventive measures.	seed and other planting materials. • Explain farm record keeping for seeds and other planting materials. • State common storage problems seeds and other planting materials, and their preventive measures.	projector, etc.	• Practice packaging and labelling of seed and other planting materials. • Monitor storage condition and seed quality. • Carry out simple storage sanitation practices. • Prepare seed and planting material records. • Identify storage problems and recommend corrective measures.	planting materials. • Practice packaging and labelling of seed and other planting materials. • Monitor storage condition and seed quality. • Carry out simple storage sanitation practices. • Prepare seed and planting material records. • Identify storage problems and recommend corrective measures.	sheets, notebooks, seeds, other planting materials e.g. suckers and bulbs, sanitation materials, practical manual, softwares, Smart phones, PPE, etc.
COURSE ASSESSMENT: Course Work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% Total: 100%						

WEED MANAGEMENT IN CROP PRODUCTION

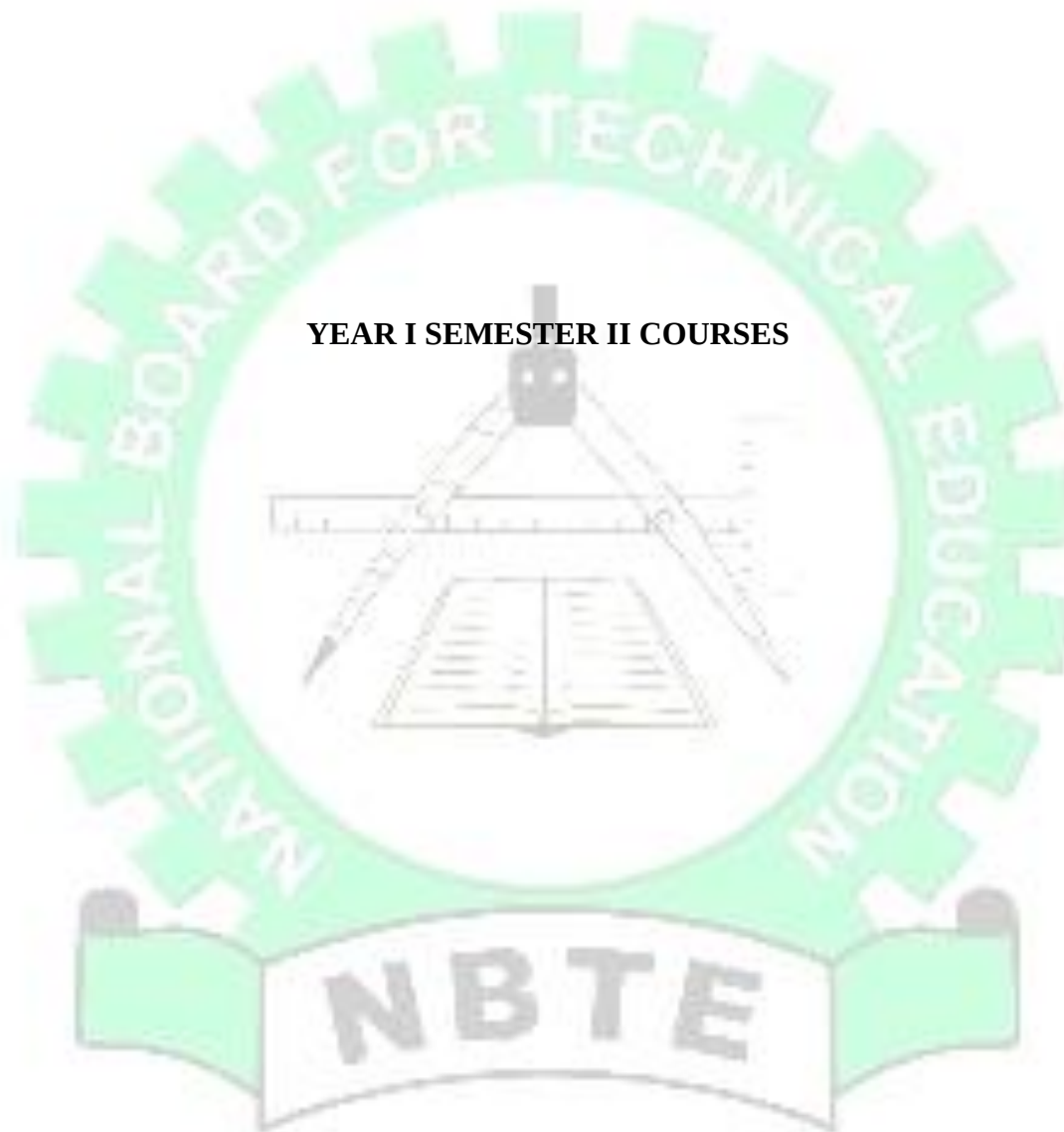
PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: WEED MANAGEMENT IN CROP PRODUCTION	COURSE CODE: OCP 315	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in weed management using sustainable, environmentally friendly and climate-smart practices in organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand weeds and their importance in organic crop production; 2.0 Understand weed biology and classification; 3.0 Understand weed management practices in organic crop production; 4.0 Understand safety and environmental protection practices in weed management in an organic crop production.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: WEED MANAGEMENT IN ORGANIC CROP PRODUCTION			COURSE CODE: OCP 315		CONTACT HOURS: 2 HOURS/WEEK	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in weed management using sustainable, environmentally friendly and climate-smart practices in organic crop production.						
GENERAL OBJECTIVE 1.0: Understand weeds and their importance in organic crop production						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Define weed 1.2 Outline the economic importance of weeds. 1.3 Explain weed identification principles 1.4 List common weed species in your locality	- Define weed - List the economic importance of weeds. - Explain weed identification principles - State common weed species in your locality	Textbooks, journals, internet, articles, projector, weed charts, marker board, marker, videos, etc.	- Identify common weeds found on crop farms. - Collect common weed species in your locality - Prepare weed albums	Guide students to: - Identify common weeds found on crop farms. - Collect common weed species in your locality - Prepare weed albums	Weed samples, hoe, cutlass, field plots, farm tools, practical manual, weed herbarium, Smart phones, PPE, etc.
General Objective 2.0: Understand weed biology and classification						

4-6	2.1 Describe weed seed dormancy and survival mechanism 2.2 Explain weed propagation and dispersal 2.3 Explain weed succession 2.4 State the factors that influence weeds proliferation 2.5 Explain classification of weeds based on life cycle, origin, morphology, etc	• Discuss weed seed dormancy and survival mechanism • Discuss weed propagation, dispersal and succession • Discuss the factors that influence weeds proliferation • Discuss classification of weeds based on life cycle, growth habit, origin, morphology, etc	Textbooks, journals, internet, articles, projector, weed charts, marker board, marker, videos, etc.	• Conduct weed seed dormancy tests • Identify weed seeds propagation and dispersal mechanisms • Identify the weeds that are propagated sexually and asexually • Compare sexual and asexual methods of propagation in weeds • Classify weeds according to life cycle, morphology, etc.	Guide students to: • Conduct weed seed dormancy tests • Identify weed seeds propagation and dispersal mechanisms • Identify the weeds that are propagated sexually and asexually • Compare sexual and asexual methods of propagation in weeds • Classify weeds according to life cycle, morphology, etc.	Weed samples, hoe, cutlass, field plots, farm tools, practical manual, Smart phones, PPE, etc
General Objective 3.0: Understand weed management practices in organic crop production						
9-11	3.1 Explain weed control 3.2 Explain various cultural methods of weed control 3.3 Explain various biological and physical methods of	• Explain weed control • Explain various cultural methods of weed control	Textbooks, journals, internet, projector, marker board,	• Carry out cultural method of weed control e.g plastic mulching,	Guide Students to: • Carry out cultural method of	Demonstration plot, Weeding machines, hoe, cutlasses,

	weed control 3.4 Explain integrated weed control 3.5 Explain weed observation records and its importance.	• Explain various biological and physical methods of weed control • Discuss integrated weed control • Explain weed observation records and its importance.	videos, etc.	earthing up, planting density, sowing time etc. • Carry out biological and physical weed control • Perform integrated weed control	weed control e.g plastic mulching, earthing up, planting density, sowing time etc. • Carry out biological and physical weed control • Perform integrated weed control.	ridger, Plastic sheet practical manual, Smart phones, PPE, etc.
General Objective 4.0: Understand safety and environmental protection practices in weed management in an organic crop production						
13-15	4.1 Explain safety measures required in weed management. 4.2 Explain environmental protection practices required in weed management. 4.3 Explain sanitation and hygiene practices required to reduce weed infestation 4.4 Explain maintenance operations required for the weed management tools	• Describe safety measures required in weed management practices. • Discuss environmental protection practices required in weed management in an organic system.	Safety charts, journals, internet, videos, projector, etc.	• Practice safe handling of weed control tools. • Assess environmental risks associated with weed management practices in an organic system. • Identify maintenance operations required for the weed	Guide students to: • Practice safe handling of weed control tools. • Assess environmental risks associated with weed management practices in an organic system. • Identify	Field plots, slasher, weeder, planter, Biological agents, harrower, practical manual, Smart phones, PPE, etc.

		• Discuss sanitation and hygiene required to reduce weed infestation • Discuss maintenance operations required for the weed management tools		management tools • Carry out maintenance operations required for the weed management tools • Prepare safety and environmental protection records	maintenance operations required for the weed management tools • Carry out maintenance operations required for the weed management tools • Prepare safety and environmental protection records	
Course Assessment: Course work: 20% Test/Assignments: 20% Examination : 60% Total = 100%						



YEAR I SEMESTER II COURSES

ORGANIC CROPS PRODUCTION II (ROOT, TUBERS, FIBER AND OTHERS)

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC CROPS PRODUCTION II (ROOT, TUBERS, FIBER AND OTHERS)	COURSE CODE: OCP 321	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in organic root, tuber, fiber, and other crop production, using sustainable, climate-smart, and environmentally friendly farming practices to improve productivity and soil health.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand origin, classification, characteristics, organic production and importance of root crops; 2.0 Understand origin, classification, characteristics, organic production and importance of tuber crops; 3.0 Understand origin, classification, characteristics, organic production and importance of fiber crops; 4.0 Understand post-harvest, handling, storage and marketing of root, tuber, fiber and other crops in organic system; 5.0 Know climate-smart practices and record keeping in root, tuber, fiber and other crops.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC CROPS PRODUCTION II (ROOT, TUBERS, FIBER AND OTHERS)			COURSE CODE: OCP 321		CONTACT HOURS: 2 HOURS/WEEK	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in organic root, tuber, fiber, and other crop production, using sustainable, climate-smart, and environmentally friendly farming practices to improve productivity and soil health.						
GENERAL OBJECTIVE 1.0: Understand origin, classification, characteristics, organic production and importance of root crops.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Explain the origin of root crops e.g cassava, sweet potatoes, carrot, beetroot cocoyam, etc. 1.2 Classify root crops based on use and morphological characteristics. 1.3 Describe botanical characteristics of roots. 1.4 Discuss organic system in the production and field management of root crops 1.5 Discuss economic and nutritional importance of root crops.	- Discuss the origin of root crops e.g cassava, sweet potatoes, cocoyam, etc. - Describe root crops based on use and morphological characteristics	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos, etc.	- Identify major root crops grown locally. - Classify root crops according to use and crop group. - Observe botanical characteristics of selected root crops. - Prepare crop identification records and herbarium samples. - Carry out	Guide students to: - Identify major root crops grown locally. - Classify root crops according to use and crop group. - Observe botanical characteristics of selected root crops. - Prepare crop identification	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks, smartphones, PPE, practical

		- Describe botanical characteristics of roots. - Explain organic production and field management of root crops - Explain economic and nutritional importance of root crops.		production of some selected root crops Prepare field production records	records and herbarium samples. - Carry out production of some selected root crops - Keep field production records	manual, etc.
General Objective 2.0: Understand origin, classification, characteristics, organic production and importance of tuber crops.						
4-6	2.1 Explain the origin of tuber crops e.g yam, potatoes, etc. 2.2 Classify tuber crops based on use and morphological characteristics. 2.3 Describe botanical characteristics of tubers. 2.4 Discuss organic production and field management of tuber crops 2.5 Discuss economic and nutritional importance of	- Discuss the origin of tuber crops e.g yam, potatoes, etc. - Describe tuber crops based on use and morphological characteristics. - Describe botanical characteristics	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos, etc.	- Identify major tuber crops grown locally. - Classify tuber crops according to use and crop growth habit. - Observe botanical characteristics of selected tuber crops. - Prepare crop identification records and herbarium samples.	Guide students to: - Identify major tuber crops grown locally. - Classify tuber crops according to use and crop growth habit. - Observe botanical characteristics	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials,

	tuber crops.	of tuber. • Explain organic production and field management of tuber crops • Explain economic and nutritional importance of tuber crops.		• Carry out production of some selected tuber crops • Prepare field production records	of selected tuber crops. • Prepare crop identification records and herbarium samples. • Carry out production of some selected tuber crops • Prepare field production records	hand lens, notebooks, smartphones, PPE, practical manual etc.
General Objective 3.0: Understand origin, classification, characteristics, organic production and importance of fiber crops.						
7-9	3.1 Discuss the origin of fiber crops e.g. kenaf, jute, cotton, etc. 3.2 Explain the classification of fiber crops based on use and morphological characteristics. 3.3 Explain botanical characteristics of Fiber crops 3.4 Discuss organic production and field management of fiber crops. 3.5 Discuss economic and nutritional importance of Fiber crops.	• Discuss the origin of fiber crops e.g. kenaf, jute, cotton, etc. • Discuss the classification of fiber crops based on use and morphological characteristics • Describe botanical characteristics of fiber crops	Smart/white boards, textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos, markers, etc.	• Identify major Fiber crops grown locally. • Classify Fiber crops according to use. • Observe botanical characteristics of selected Fiber crops. • Prepare crop identification records and herbarium samples. • Carry out production of some selected fiber crops. • Prepare field production records	Guide students to: • Identify major Fiber crops grown locally. • Classify Fiber crops according to use. • Observe botanical characteristics of selected Fiber crops. • Prepare crop identification records and	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks, smartphones, PPE,

		• Explain organic production and field management of Fiber crops • Explain economic and nutritional importance of Fiber crops.			herbarium samples. • Carryout production of some selected fiber crops. • Keep field production records	practical manual etc.
General Objective 4.0: Understand post-harvest handling, storage and marketing of root, tuber and fiber crops in organic system.						
10-12	4.1 Discuss crop maturity indices for root, tuber and fiber crops 4.2 Describe harvesting methods and equipment in root, tuber and fiber production 4.3 Explain handling, sorting and grading in root, tuber and fiber production 4.4 Explain packaging and storage in root, tuber and fiber production 4.5 Describe primary processing for each crop group 4.6 Discuss marketing in root, tuber and fiber production	• Discuss crop maturity indices for root, tuber and fiber crops • Explain harvesting methods and equipment in root, tuber and fiber production • Describe handling, sorting and grading in root, tuber and fiber production • Describe packaging and storage in root, tuber and fiber	White/Smart boards, markers, textbooks, journals, internet, charts, projector, pest identification manuals, videos, etc.	• Identify maturity indices in root, tuber and fiber crops • Identify harvesting equipment in root, tuber and fiber crops • Carry out harvesting and handling of root, tuber and fiber crops • Carry out sorting and grading • Carry out threshing, winnowing and other processing operations. • Determine moisture content of selected crops before storage • Carry out packaging and storage of root,	Guide students to: • Identify maturity indices in root, tuber and fiber crops • Identify harvesting equipment in root, tuber and fiber crops • Carry out harvesting and handling of root, tuber and fiber crops • Carry out sorting and grading • Carry out threshing, winnowing and	Threshers, storage bins, dryers, organic storage inputs, sprayers, Silo, warehouse, drying slabs, Smartphones PPE, practical manual, Harvesting tools, scales, grading tables,

		production • Explain primary processing for each crop group • Explain marketing in root, tuber and fiber production		tuber and fiber crops • Undertake market survey of root, tuber and fiber crops • Keep records of all the operations manually and digitally	other processing operations. • Determine moisture content of selected crops before storage • Carry out packaging and storage of root, tuber and fiber crops • Undertake market survey of root, tuber and fiber crops • Keep records of all the operations manually and digitally	moisture meter, hermetic bags, open sacks, etc.
General Objective 5.0: Know climate-smart practices and record keeping in root, tuber and fiber crops.						
13-15	5.1 Explain climate-smart agricultural practices in roots, tubers and fiber production. 5.2 State effects of climate change on roots, tubers and Fiber crops. 5.3 Explain climate risk adaptation practices in field organic crop production. 5.4 Explain farm record keeping in root, tuber and fiber	• Discuss climate-smart crop production using local farming examples. • Explain climate change effects on roots, tubers and Fiber crops. • Discuss farm documentation	White/smart boards, markers, textbooks, journals, internet, climate-smart agriculture manuals, annual NIMET reports, charts,	• Carry out climate-smart demonstration for selected crops on already established plot. • Practice water-efficient irrigation and watering methods where applicable. • Interpret weather information using smartphone weather	Guide students to: • Carry out climate-smart demonstration for selected crops on already established plot. • Practice water-efficient irrigation and watering methods where	GPS, Sensors, drones, robots, computer, irrigation materials, field plots, smartphones, weather apps,

	production.	and record keeping procedures. • Describe use of climate information for farm decision-making.	projector, videos, weather reports, farm record templates etc.	applications. • Prepare climate-based planting calendar for selected crops. • Keep farm records on planting date, weather condition, input use and crop performance. • Practice farm documentation for roots, tubers and fiber production.	applicable. • Access and interpret weather information using smartphone weather applications. • Prepare climate-based planting calendar for selected crops. • Keep farm records on planting date, weather condition, input use and crop performance. • Practice farm documentation for roots, tubers and fiber production.	notebooks, farm record sheets, PPE, practical manual, crop production records etc.
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%						

IRRIGATION AND WATER CONSERVATION SYSTEMS IN ORGANIC CROP PRODUCTION

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: IRRIGATION AND WATER CONSERVATION SYSTEMS IN ORGANIC CROP PRODUCTION	COURSE CODE: OCP 322	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in irrigation systems, water management and water conservation practices for sustainable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Know irrigation systems used in organic crop production; 2.0 Know irrigation scheduling and water requirements of crops; 3.0 Understand water conservation practices in organic farming; 4.0 Know irrigation system maintenance and water management practices.		

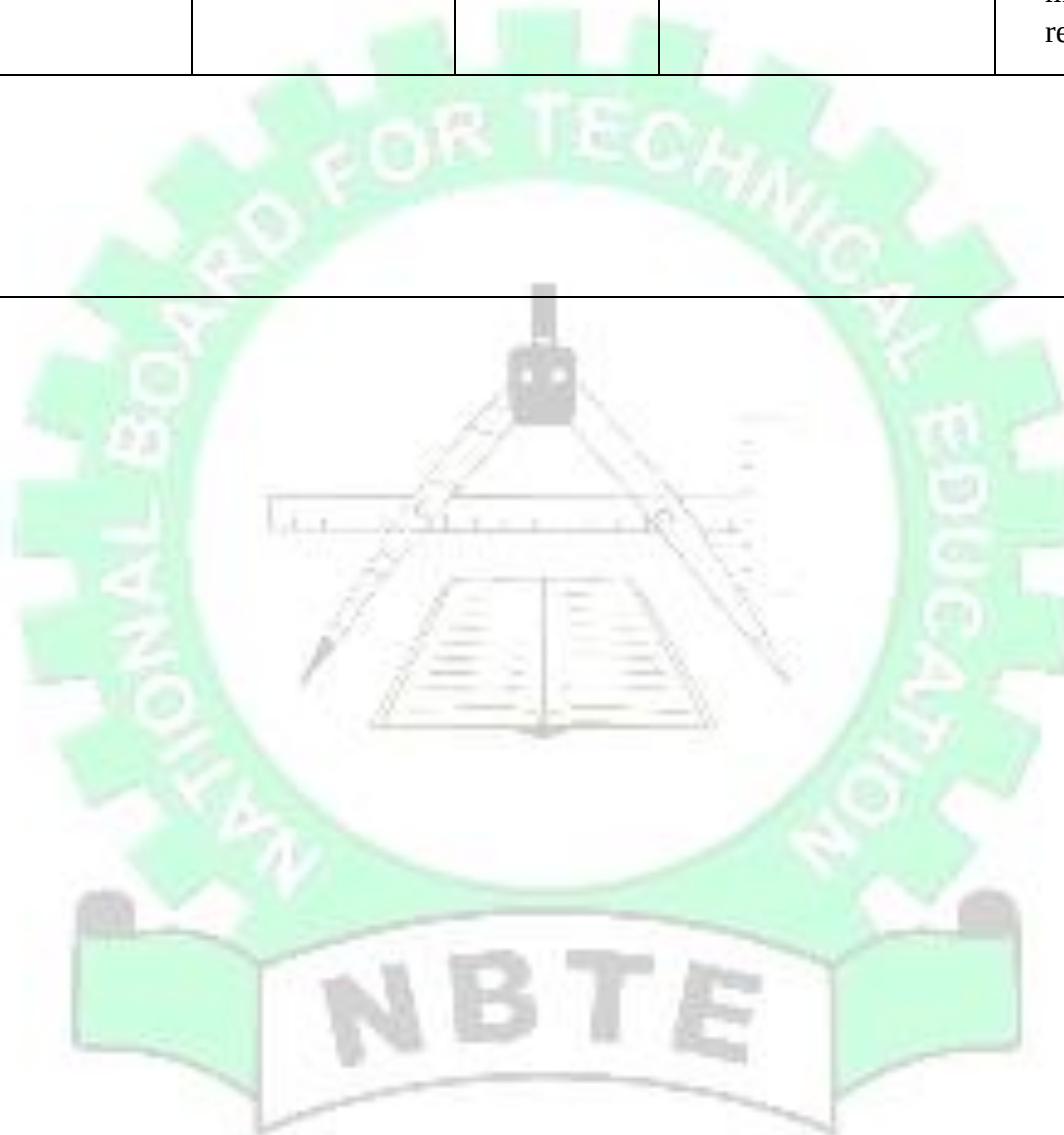
PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: IRRIGATION AND WATER CONSERVATION SYSTEMS IN ORGANIC CROP PRODUCTION			COURSE CODE: OCP 322		CONTACT HOURS: 2 HOURS/WEEK	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in irrigation systems, water management and water conservation practices for sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Know irrigation systems used in organic crop production						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain irrigation and its importance in crop production. 1.2 Explain types of irrigation systems used in crop production. 1.3 Explain irrigation methods (e.g. surface, sprinkler, drip and manual irrigation methods, etc). 1.4 Highlight the advantages and limitations of irrigation systems. 1.5 Explain factors affecting choice of irrigation methods.	- Discuss irrigation concepts and their importance in crop production using local examples. - Discuss irrigation systems used in crop production. - Describe irrigation methods	Textbooks, journals, internet, charts, projector, videos, marker board, etc.	- Identify irrigation tools and equipment. - Carry out surface irrigation methods and manual watering techniques. - Carry out simple drip and sprinkler system setup. - Practice irrigation method selection for different crops. - Observe water distribution patterns on field plots. - Prepare irrigation	Guide students to: - Identify irrigation tools and equipment. - Carry out surface irrigation methods and manual watering techniques. - Carry out simple drip and sprinkler system setup. - Practice irrigation method selection	Watering cans, hoses, drip lines, sprinkler kits, field plots, farm tools, irrigation equipment/tools, practical manual, smartphones, PPE, etc.

		through illustrations and field examples. • Discuss the advantages and limitations of irrigation systems • Discuss factors affecting choice of irrigation methods.		observation records.	for different crops. • Observe water distribution patterns on field plots. • Prepare irrigation observation records.	
General Objective 2.0: Know irrigation scheduling and water requirement of crops						
4-7	2.1 Explain irrigation scheduling practices. 2.2 Explain methods of irrigation scheduling (Feel and appearance method, Tensiometers, Gypsum blocks, Soil moisture sensors) 2.3 State crop water requirement 2.4 Explain methods of estimating water requirement of crops 2.5 Describe irrigation efficiency and factors affecting irrigation efficiency.	• Explain irrigation scheduling practices. • Explain methods of irrigation scheduling (Feel and appearance method, Tensiometers, Gypsum blocks, Soil moisture sensors) • Discuss crop	Textbooks, journals, internet, charts, projector, videos, etc.	• Prepare simple irrigation schedule for selected crops. • Carry out irrigation timing and watering practices. • Practice estimation of water requirements of crops. • Monitor soil moisture before and after irrigation. • Practice water application for nursery and field crops.	Guide students to: • Prepare simple irrigation schedule for selected crops. • Carry out irrigation timing and watering practices. Practice estimation of water requirements of crops. • Monitor soil	Measuring containers, Lysimeters, tensiometers, soil moisture meter/sensors, evaporation pans, flumes, practical manual, smartphones, PPE, etc.

		water requirement • Explain methods of estimating water requirement of crops • Explain irrigation efficiency and factors affecting irrigation efficiency.		• Prepare irrigation scheduling records.	moisture before and after irrigation. • Practice water application for nursery and field crops. • Prepare irrigation scheduling records.	
General Objective 3.0: Understand water conservation practices in organic farming						
8-11	3.1 Explain water conservation practices in crop production. 3.2 Explain rainwater harvesting practices. 3.3 Describe efficient water use in organic farming. 3.4 Explain soil moisture conservation methods	• Explain water conservation practices in crop production. • Explain rainwater harvesting practices. • Explain efficient water use in organic farming.	Textbooks, journals, internet, charts, videos, projector, etc.	• Carry out mulching for moisture conservation. • Practice rainwater harvesting techniques. • Establish simple water conservation demonstration plots. • Monitor moisture retention on field plots. • Prepare water	Guide students to: • Carry out mulching for moisture conservation. • Practice rainwater harvesting techniques. • Establish simple water conservation demonstration	Mulching materials, plastic sheets, drums, buckets, watering cans, field plots, farm tools, practical manual, PPE, smartphones, etc.

		• Explain soil moisture conservation methods		conservation records.	plots. • Monitor moisture retention on field plots. • Prepare water conservation records.	
General Objective 4.0: Know irrigation system maintenance and water management practices						
12-15	4.1 Explain maintenance of irrigation systems. 4.2 State common irrigation system problems. 4.3 Explain water management practices in crop production. 4.4 Describe maintenance procedures for irrigation facilities.	• Discuss irrigation maintenance practices. • Explain common system problems and solutions. • Discuss irrigation maintenance procedures. • Explain water management practices in crop production	Textbooks, journals, charts, projector, videos, white/smart board, markers, internet, etc.	• Carry out simple repair and maintenance of irrigation facilities. • Practice cleaning of irrigation systems. • Conduct inspection of irrigation equipment. • Carry out water management activities on field plots. • Prepare irrigation maintenance records.	Guide students to: • Carry out simple repair and maintenance of irrigation facilities. • Practice cleaning of irrigation systems. • Conduct inspection of irrigation equipment. • Carry out water management activities on field plots. • Prepare irrigation	Irrigation tools, pipes, hoses, repair tools, maintenance kits/tools, PPE, practical manual, smartphones, etc.

					maintenance records.	
COURSE ASSESSMENT: Course Work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% Total: 100%						



PLANT HEALTH AND DISEASE DIAGNOSTICS IN ORGANIC SYSTEM

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: PLANT HEALTH AND DISEASE DIAGNOSTICS IN ORGANIC SYSTEM	COURSE CODE: OCP 323	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in plant health assessment, disease diagnosis and disease management for sustainable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand plant health and disease concepts in organic crop production; 2.0 Know causes, symptoms and spread of plant diseases in crop production; 3.0 Know plant disease diagnostics and field monitoring practices; 4.0 Know disease management practices in organic system; 5.0 Understand field sanitation and preventive plant health practices in organic system; 6.0 Know plant health records and diagnostic reporting practices.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: PLANT HEALTH AND DISEASE DIAGNOSTICS IN ORGANIC SYSTEM		COURSE CODE: OCP 323			CONTACT HOURS: 2 HOURS/WEEK	
		CREDIT UNIT: 2			THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II		PRE-REQUISITE:			PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in plant health assessment, disease diagnosis and disease management for sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Understand plant health and disease concepts in organic crop production						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2	1.1 Define plant health and disease. 1.2 Explain plant health and disease concepts. 1.3 Highlights the importance of plant health in crop production. 1.4 Explain factors affecting plant health. 1.5 Distinguish between healthy and unhealthy plant conditions. 1.6 Explain indicators of poor plant health.	- Define plant health and disease - Explain plant health and disease concepts. - Highlights the importance of plant health in crop production. - Explain factors affecting	Textbooks, journals, internet, white/smart boards, charts, projector, crop samples, videos, etc.	- Identify symptoms of unhealthy crop plants. - Compare healthy and diseased crop samples. - Carry out simple plant health inspection on field plots. - Observe crop growth abnormalities. - Prepare simple plant health observation records.	Guide students to: - Identify symptoms of unhealthy crop plants. - Compare healthy and diseased crop samples. - Carry out simple plant health inspection on field plots. - Observe crop	Crop samples, field plots, notebooks, hand lens, farm tools, virtual lab, smartboards, PPE, practical manual, smartphones, etc.

		plant health. • Distinguish between healthy and unhealthy plant conditions. • Explain indicators of poor plant health.			growth abnormalities • Prepare simple plant health observation records.	
General Objective 2.0: Know causes, symptoms and spread of plant diseases in crop production						
3-5	2.1 Explain causes of plant diseases. 2.2 Describe fungal, bacterial and viral diseases affecting crops. 2.3 Explain disease symptoms and signs in crops. 2.4 Describe disease spread and transmission methods. 2.5 Explain environmental conditions influencing disease development.	• Discuss causes of plant diseases. • Discuss fungal, bacterial and viral diseases affecting crops. • Describe diseased crop samples and charts. • Describe disease symptoms and signs in crops. • Discuss	Textbooks, journals, disease charts, smart/white boards, markers, projector, crop samples, videos, etc.	• Identify diseased crop samples • Identify disease symptoms on different crop samples. • Conduct field scouting for disease symptoms. • Compare symptoms of fungal, bacterial and viral diseases. • Classify plant disease symptoms according to type. • Label diseased plants on field plots.	Guide students to: • Identify diseased crop samples • Identify disease symptoms on different crop samples. • Conduct field scouting for disease symptoms. • Compare symptoms of fungal, bacterial and viral	Diseased crop samples, hand lens, field plots, labels, notebooks, disease charts, smartphones, virtual lab, PPE, practical manual, etc.

		disease spread and transmission methods development. Discuss environmental conditions influencing disease development.		- Carry out disease incidence counting. - Prepare disease observation records.	diseases. - Classify plant disease symptoms according to type. - Label diseased plants on field plots. - Carry out disease incidence counting. - Prepare disease observation records.	
General Objective 3.0: Know plant disease diagnostics and field monitoring practices						
6-8	3.1 Explain plant disease diagnostic principles. 3.2 Describe disease monitoring practices in crop production. 3.3 Explain disease diagnosis procedures. 3.4 Describe disease sample collection and preservation methods. 3.5 Explain disease incidence and severity assessment methods.	- Discuss plant disease diagnostic principles. - Describe disease monitoring and sample handling methods. - Describe	Textbooks, journals, internet, smart/white boards, charts, projector, videos, etc.	- Conduct routine field scouting and monitoring. - Collect diseased plant samples from field plots. - Practice labelling and preservation of plant samples. - Carry out simple disease diagnosis	Guide students to: - Conduct routine field scouting and monitoring. - Collect diseased plant samples from field plots. - Practice labelling and preservation of plant samples.	Sample containers, labels, hand lens, disease charts, field plots, notebooks, smartphones, virtual lab, PPE, practical

		diagnostic procedures using practical examples. • Explain disease monitoring and sample handling methods. • Discuss disease assessment techniques.		exercises. • Assess disease incidence and severity levels. • Prepare simple diagnostic sheets. • Map disease occurrence on field plots. • Prepare disease monitoring records.	• Carry out simple disease diagnosis exercises. • Assess disease incidence and severity levels. • Prepare simple diagnostic sheets. • Map disease occurrence on field plots • Prepare disease monitoring records.	manual etc.
General Objective 4.0: Know disease management practices in organic system						
9-11	4.1 Explain disease management practices in organic system. 4.2 Describe physical methods of disease management 4.3 Explain disease suppressants and control materials. 4.4 Explain cultural disease management methods. 4.5 Explain biological disease management methods. 4.6 Explain integrated plant health management practices.	• Explain disease management practices in organic system. • Describe physical methods of disease management • Explain	Textbooks, journals, internet, charts, smart/white boards, projector, videos, etc.	• Conduct sanitation and preventive field management practices. • Prepare simple botanical as disease suppressants. • Calibrate sprayers for botanical application. • Practice application of the botanical for	Guide students to: • Conduct sanitation and preventive field management practices. • Prepare simple botanical as disease suppressants. • Calibrate	Sprayers, organic materials, microbial products, PPE, disposal materials, field plots, crop samples, smartphones,

		disease suppressants and control materials. • Explain cultural disease management methods. • Explain biological disease management methods. • Explain integrated plant health management practices.		disease control. • Carry out removal and safe disposal of infected plant materials. • Monitor effectiveness of disease management practices. • Prepare disease control records.	sprayers for botanical application. • Practice application of the botanical for disease control. • Carry out removal and safe disposal of infected plant materials. • Monitor effectiveness of disease management practices. • Prepare disease control records.	virtual lab, practical manual, etc.
General Objective 5.0: Know field sanitation and preventive plant health practices in organic system						
12-14	5.1 Describe field sanitation practices in crop production. 5.2 Explain preventive plant health management practices. 5.3 Explain maintenance of healthy crop environment. 5.4 Discuss field sanitation procedures in crop production.	• Discuss field sanitation practices using practical examples. • Discuss	Textbooks, journals, charts, projector, white/smart boards, markers, videos,	• Carry out field sanitation activities on crop plots. • Practice removal of infected plant residues. • Conduct routine hygiene and	Guide students to: • Carry out field sanitation activities on crop plots. • Practice	Hoe, rake, cutlass, disposal materials, field plots, PPE, smartphones, virtual lab,

	5.5 Explain the role of biosecurity in pest and disease management	preventive plant health management practices. - Describe the maintenance of healthy crop environment. - Describe field sanitation procedures. - Discuss the role of biosecurity in pest and disease management	internet, etc.	preventive management practices. - Carry out weed and debris removal for disease prevention. - Prepare sanitation records.	removal of infected plant residues. - Conduct routine hygiene and preventive management practices. - Carry out weed and debris removal for disease prevention. - Prepare sanitation records.	practical manual, etc.
General Objective 6.0: Know plant health records and diagnostic reporting practices						
15	6.1 Explain plant health record keeping practices. 6.2 Discuss diagnostic reporting	Discuss plant health	Textbooks, journals, internet,	Prepare plant health and disease records.	Guide students to: Prepare plant	Record sheets, notebooks,

	practices. 6.3 Explain importance of plant health documentation. 6.4 State the importance of records.	documenta tion and reporting methods. • Discuss diagnostic reporting practices. • Discuss the importance of plant health documenta tion • Discuss importance of records.	smart/white boards, charts, videos etc.	• Prepare simple diagnostic report sheets. • Practice disease incidence recording and reporting. • Compile simple field diagnostic report.	health and disease records. • Prepare simple diagnostic report sheets. • Practice disease incidence recording and reporting. • Compile simple field diagnostic report.	sample report formats, smartphones, virtual lab, PPE, practical manual, etc.
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COURSE ASSESSMENT:

Course Work – 10%

Test/Assignments – 10%

Practical – 40%

Examination – 40%

Total = 100%

ORGANIC HORTICULTURAL CROPS PRODUCTION

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC HORTICULTURAL CROPS PRODUCTION	COURSE CODE: OCP 324	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to provide students with knowledge and skills of horticultural crops and their production, with emphasis on fruits, vegetables (including mushroom), herbs, spices, etc. in organic system.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the scope and importance of horticulture and the classification of horticultural crops; 2.0 Know organic vegetable production under open field conditions in an organic system; 3.0 Understand organic orchard establishment and management; 4.0 Know the cultivation of herbs and spices in organic system; 5.0 Know the techniques of mushroom production in organic system; 6.0 Know horticultural nursery establishment and management techniques.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC HORTICULTURAL CROPS PRODUCTION			COURSE CODE: OCP 324		CONTACT HOURS: 2 HOURS/WEEK	
			CREDIT UNIT:2		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with knowledge and skills of horticultural crops and their production, with emphasis on fruits, vegetables (including mushroom), herbs, spices, etc. in organic system.						
GENERAL OBJECTIVE 1.0: Understand the scope and importance of horticulture and the classification of horticultural crops						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2	1.1 Define horticulture. 1.2 Explain the scope of horticulture. 1.3 Explain the classification of horticultural crops. 1.4 Describe the importance of horticulture in terms of nutritional, economic and environmental sustainability. 1.5 Discuss horticulture as climate-smart high-value sector.	- Explain horticulture - Describe the scope of horticulture, eg pomology, olericulture, floriculture, viticulture, etc. - Discuss the Classification of horticultural crops according to use, life cycle, growth habit and climatic requirements, etc. - Discuss the nutritional importance of horticultural crops	Horticulture textbooks, NIHORT publications, FMARD horticultural value chain reports, smart/white boards classification charts, Audio visuals, LCD projector	- Identify horticultural crops by botanical name - Classify horticultural crops according to use, life cycle, growth habit and climatic requirements, etc. - Visit a local horticultural farm or market to identify - Document value chain from farm to fork - Keep horticultural farm records	Guide students to: - Identify horticultural crops by botanical name - Classify horticultural crops according to use, life cycle, growth habit and climatic requirements, etc. - Visit a local horticultural farm or market	Horticultural specimens, identification chart, classification table, horticultural farm or market, notebooks, smartphone, PPE, practical manuals.

		• Explain the economic importance of horticulture • Discuss horticulture as climate-smart high-value sector			• to identify value chain from farm to fork • Keep horticultural farm records	
General Objective 2.0: Know vegetable production under open field conditions in an organic system						
3 - 4	2.1 Describe production of leaf vegetables in an organic system: amaranth, fluted pumpkin (Telfairia), cabbage, etc 2.2 Describe production of fruit vegetables in an organic system: tomato, pepper, okra, etc. 2.3 Describe production of bulb/root vegetables in an organic system: onion, ginger, carrots, leek, potato etc. 2.4 Explain the climatic requirements for vegetable production	• Explain production of leaf vegetables in an organic system: amaranth, fluted pumpkin (Telfairia), cabbage, etc • Explain production of fruit vegetables in an organic system: tomato, pepper, okra, etc. • Explain production of bulb/root vegetables in an organic system: onion, ginger, carrots, leek, potato etc. • Explain the climatic requirements for vegetable production	White/smart board, on school farm, Nigerian National Variety Catalogue, audio visuals, projector, etc.	• Establish 50 m² field each of tomato (transplanted from nursery), okra and amaranth at recommended spacing. Manage to harvest; calculate yield (kg/m²) • Prepare production record.	Guide students to: • Establish 50 m² field each of tomato (transplanted from nursery), okra and amaranth at recommended spacing; manage to harvest; calculate yield (kg/m²) • Prepare production record.	School farm, vegetable seedlings, organic fertilizers hoes, weighing scale; PPE, smartphones, practical manuals, etc.
General Objective 3.0: Know organic orchard establishment and management						

5 - 6	3.1 Describe orchard establishment in organic systems: site selection, layout (square, triangular, hexagonal), spacing etc 3.2 Explain site factors (slope, soil drainage, water access); compare layout systems 3.3 Describe production of mango, citrus, banana/plantain, pawpaw, pineapple etc. 3.4 Explain the methods of asexual propagation: budding, grafting, layering, sucker separation etc. 3.5 Discuss the management of major pests and diseases of fruit crops; 3.6 Discuss harvesting, sorting, packaging, marketing of fruits	• Discuss orchard establishment in organic systems: site selection, layout (square, triangular, hexagonal), spacing etc • Discuss site factors (slope, soil drainage, water access); compare layout systems • Explain each fruit crop agronomy; mango grafting; banana sucker management; pineapple slip propagation • Explain the methods of asexual propagation: budding, grafting, layering, sucker separation • Explain bunchy top virus; mango anthracnose; pineapple mealybug; harvest indices, cold-chain	White/smart board, Fruit crop seedlings and suckers, grafting tools, NIHORT/NRC RI fruit guides, audio visuals, projector, etc.	• Carry out budding, layering and grafting • Record success rate • Establish a mini-orchard with 4 fruit species (mango, citrus, banana, pawpaw) where possible • Apply organic pesticides, harvest fruits and package for markets. • Prepare farm production records	Guide students to: • Carry out budding, layering and grafting • Record success rate • Establish a mini-orchard with 4 fruit species (mango, citrus, banana, pawpaw) where possible • Apply organic pesticides, harvest fruits and package for markets. • Prepare farm production records	Citrus rootstocks, scion sticks, grafting knife, parafilm; guava branches, polythene, soil, plastic; mango, citrus, banana, sprayers, pawpaw seedlings, organic pesticides, harvesting containers, smartphones, practical manuals, etc.
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		logistics etc.				
General Objective 4.0: Know the cultivation of herbs and spices in organic systems.						
7 – 9	4.1 Define herbs and spices 4.2 Classify herbs and spices 4.3 Explain propagation methods e.g. sexual and asexual 4.4 Discuss the agronomic practices of herbs and spices cultivation. 4.5 Explain harvesting indices, handling and drying. 4.6 Discuss processing and packaging of herbs and spices in organic systems	• Explain herbs and spices • Classify herbs and spices • Explain propagation methods e.g. sexual and asexual • Discuss the agronomic practices of herbs and spices cultivation. • Explain harvesting indices, handling and drying. • Discuss processing and packaging of herbs and spices in organic systems	White/smart board, textbooks, NIHORT publications, Audio visuals, projector, videos, etc.	• Set up a small herbs and spices garden in organic systems • Grow garlic, ginger, cloves, curry, etc. in organic systems • Visit a working herbs and spices farm • Document observations	Guide students to: • Set up a small herbs and spices garden in organic systems • Grow garlic, ginger, cloves, curry, etc. in organic systems • Visit a working herbs and spices farm • Document observations	Nursery beds; seeds; dehydrator, moisture-metre, trays, soil test kits, LED specs, calculator; smartphone, notebooks, smartphones, practical manuals, etc.
General Objective 5.0: Identify the taxonomy, cultivation and harvesting of mushroom in organic system						
10 - 12	5.1 Explain taxonomy and biology of mushroom 5.2 Describe production of mushroom in an organic system. 5.3 Describe the environmental factors for	• Describe taxonomy and biology of mushroom. • Explain the production of mushroom in an	Horticulture textbooks, smartphones, National Catalogues, publications, classification	• Identify the taxonomy and biology of mushroom. • Select strains and prepare compost/substrate	Guide students to: • Identify the taxonomy and biology of mushroom. • Select strains and prepare	Mushroom specimens, identification chart, classification table; horticultural

organic mushroom production 5.4 Discuss organic substrate preparation in organic mushroom production. 5.5 Discuss common pests and diseases of mushroom 5.6 Highlight disease symptoms of mushroom (green spore patches on substrate, stunted mycelium, malformed pins, reduced yields etc.). 5.7 Discuss the methods of disease control/prevention. 5.8 Describe the nutritional and economic benefits of mushroom. 5.9 Explain harvesting, sorting/grading, packaging and marketing of mushroom.	organic system (strain selection, substrate sourcing and preparations, spawn production or inoculation, Incubation etc). • State the environmental parameters for organic mushroom production (eg temperature, relative humidity, CO₂, light, substrate moisture, etc.) • Describe common contaminants and process of mitigation • Explain organic substrate preparation in organic mushroom production. • Discuss common pests and diseases of mushroom (eg	charts, Audio visuals, projector, etc.	for spawn cropping cycles of mushrooms. • Prepare organic substrate • Identify pests and diseases of mushroom with hand lens. • Carry out spraying operation on crops and conduct sanitation and monitor crops for early detection. • Observe harvesting and post-harvest operations. • Prepare all production record	compost/substrate for spawn cropping cycles of mushrooms. • Prepare organic substrate • Observe and identify pests and diseases of mushroom with hand lens. • Carry out spraying operation on crops and conduct sanitation and monitor crops for early detection. • Observe harvesting and post-harvest operations. • Prepare all production record	farm or market, notebooks, smartphone, sterile workspace, sterilization tools, PPE, Smartphones, thermometer, hygrometer, sawdust, moisture meter, etc.
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		common mold, cobweb mold, dry bubble, etc.). • Mention the disease symptoms of mushroom (green spore patches on substrate, stunted mycelium, malformed pins, reduced yields etc.). • Describe the methods of disease control/prevention (eg sanitation and exclusion, substrate hygiene, environmental control, monitoring and early detection, etc.). • Discuss harvesting, sorting/grading, packaging and marketing of				
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		mushroom.				
General Objective 6.0: Know horticultural nursery establishment and management in an organic system						
13-15	6.1 Describe nursery types: ground bed, raised bed, container, plug tray, screen house nursery etc. 6.2 Describe growing medium preparation: topsoil, compost, perlite, coco peat, etc. 6.3 Explain nursery operations in organic systems. 6.4 Explain disease, weed and pest management in the nursery.	• Discuss nursery types; • Explain media composition; sterilisation by solarisation, steaming, etc. • Discuss nursery sowing, watering schedule, hardening before transplanting. • Discuss disease, weed and pest management in the nursery.	White/smart boards, Nursery trays, growing media, seeds, watering can, Trichoderma, NIHORT nursery manual, Audio visuals, projector, videos, etc.	• Establish nursery for tomato, pepper, turmeric, ginger seedlings etc. using mixed media. • Record germination percentage and survival. • Develop a small nursery business plan for selling vegetable seedlings. • Calculate cost, price, profit. • Prepare farm activity records.	Guide students to: • Establish nursery for tomato, pepper, turmeric, ginger seedlings etc. using mixed media. • Record germination percentage and survival. • Develop a small nursery business plan for selling vegetable seedlings; calculate cost, price,	Nursery trays, growing media, seeds, watering can; business plan template, market data, calculator, smartphones, practical manuals, etc.

					profit. • keep farm activity records.	
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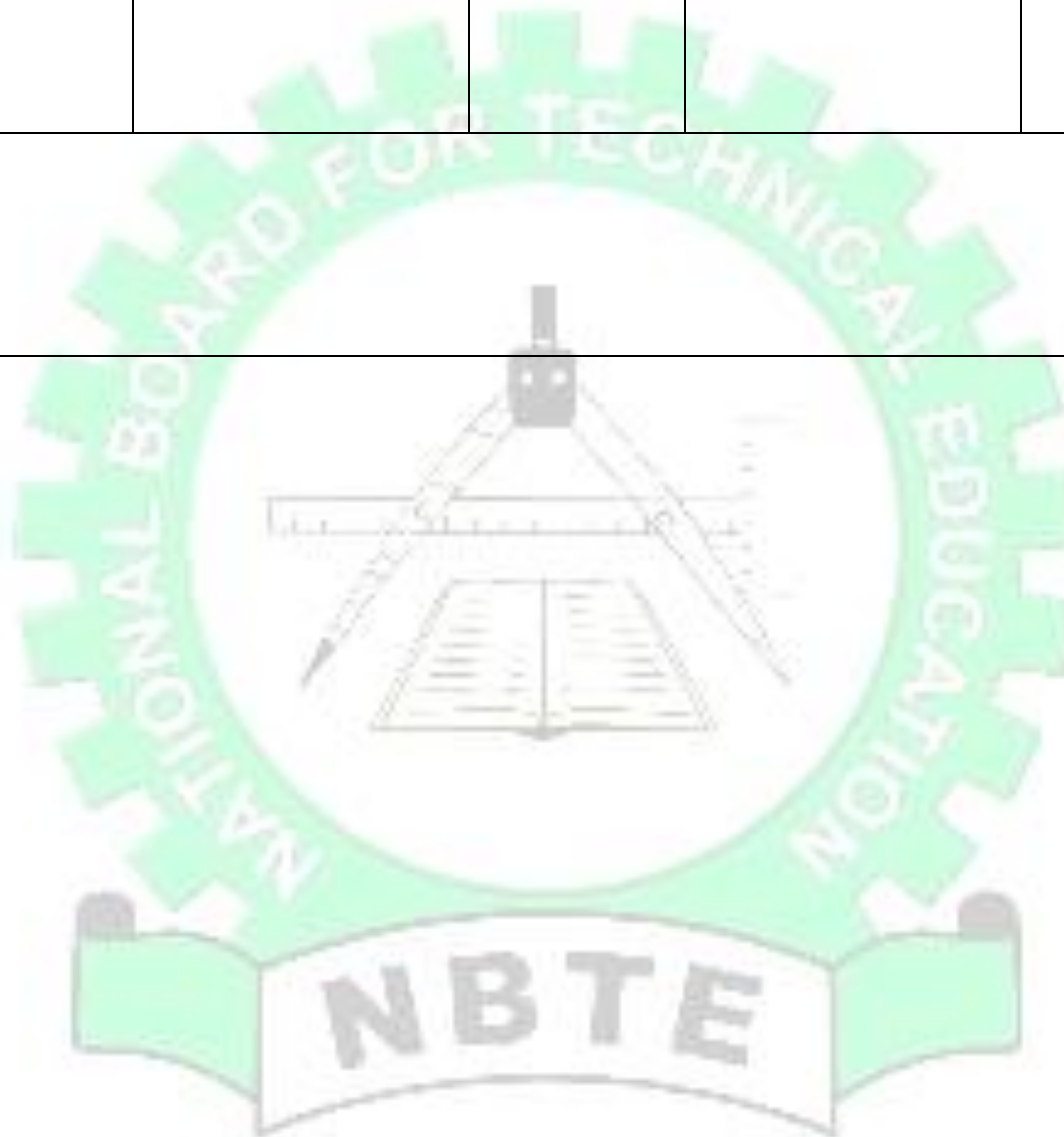
COURSE ASSESSMENT:

Course work: 10%

Test/Assignments: 10%

Practical 40%

Examination: 40%

Total: 100%

FIELD PRACTICAL I (ORGANIC CROP PRODUCTION TRIALS AND DEMONSTRATION PLOTS)

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: FIELD PRACTICAL I (ORGANIC CROP PRODUCTION TRIALS AND DEMONSTRATION PLOTS)	COURSE CODE: OCP 325	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL:
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with skills in organic crop production through field trials, demonstration plot establishment, crop management, monitoring and farm record keeping using sustainable organic farming practices.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Know organic field preparation and demonstration plot establishment practices; 2.0 Know nursery establishment and planting practices in organic crop production; 3.0 Know irrigation, soil fertility and crop maintenance practices in organic system; 4.0 Know weed, pest and disease management practices in organic system; 5.0 Know crop monitoring, growth assessment and field trial management practices; 6.0 Know harvesting, yield assessment and post-harvest handling practices; 7.0 Know field documentation and farm record keeping practices.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: FIELD PRACTICAL I (ORGANIC CROP PRODUCTION TRIALS AND DEMONSTRATION PLOTS)			COURSE CODE: OCP 325		CONTACT HOURS: 2 HOURS/WEEK	
			CREDIT UNIT: 2		THEORETICAL: 0 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with practical skills in organic crop production through field trials, demonstration plot establishment, crop management, monitoring and farm record keeping using sustainable organic farming practices.						
GENERAL OBJECTIVE 1.0: Know organic field preparation and demonstration plot establishment practices						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2				• Identify suitable sites for organic crop production trials. • Conduct soil analysis. • Carry out land clearing and field preparation. • Conduct plot layout and land measurement. • Establish demonstration plots for selected crops. • Prepare ridges, beds and planting areas. • Keep field preparation records.	Guide students to: • Identify suitable sites for organic crop production trials. • Conduct soil analysis. • Carry out land clearing and field preparation. • Conduct plot layout and land measurement. • Establish demonstration plots	Power tillers, tractor, ridger, harrower, measuring tape, land measuring tools, pegs, ropes, field plots, GPS, PPE, auger, moisture can, practical manual, smart phones, Farm implements etc.

					for selected crops. • Prepare ridges, beds and planting areas. • Keep field preparation records.	
General Objective 2.0: Know nursery establishment and planting practices in organic crop production						
3-4				• Prepare nursery beds and nursery media. • Carry out organic Seed treatment practices. • Sow seeds in nursery trays, poly bags or nursery beds. • Carry out watering, shading and seedling management. • Practice thinning and seedling hardening. • Conduct transplanting and direct planting operations. • Keep nursery and planting records.	Guide students to: • Prepare nursery beds and nursery media. • Carry out organic Seed treatment practices. • Sow seeds in nursery trays, poly bags or nursery beds. • Carry out watering, shading and seedling management. • Practice thinning and seedling hardening. • Conduct transplanting and direct planting	Nursery trays, watering cans, shade materials, Organic soil media, seedlings, farm tools, poly bags, irrigation equipment, cell trays, seeds, media components, Organic seed treatment materials, PPE, practical manual, Smart phones etc.

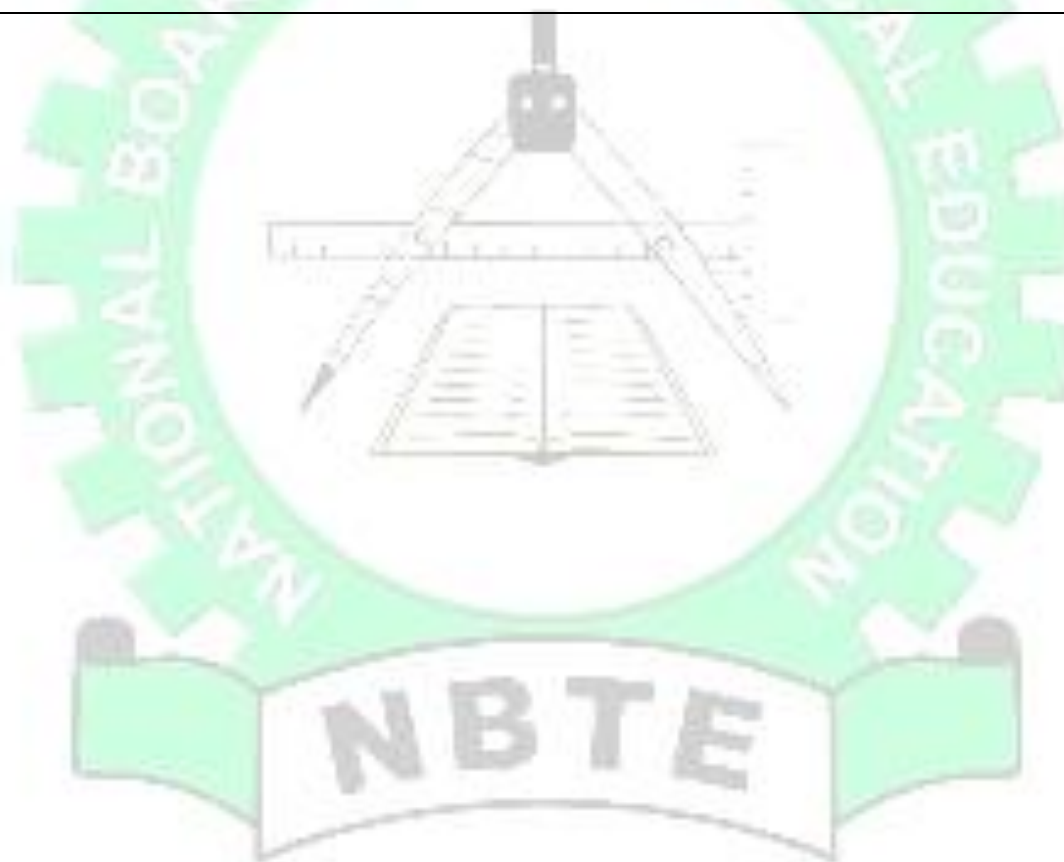
					operations. • Keep nursery and planting records.	
General Objective 3.0: Know irrigation, soil fertility and crop maintenance practices in organic system						
5-7				• Carry out irrigation and watering activities on field plots. • Apply compost, manure and organic nutrient materials. • Practice mulching and moisture conservation techniques. • Perform organic soil fertility improvement practices. • Carry out gap filling and spacing adjustment. • Keep crop maintenance records.	Guide students to: • Carry out irrigation and watering activities on field plots. • Apply compost, manure and organic nutrient materials. • Practice mulching and moisture conservation techniques. • Perform organic soil fertility improvement practices. • Carry out gap filling and spacing adjustment. • Keep crop maintenance records.	Compost, manure, Organic nutrient, watering cans, mulch materials, field plots, farm tools, irrigation equipment, PPE, practical manual, smart phones, sensors, reliable water source etc.
General Objective 4.0: Know weed, pest and disease management practices in organic system						

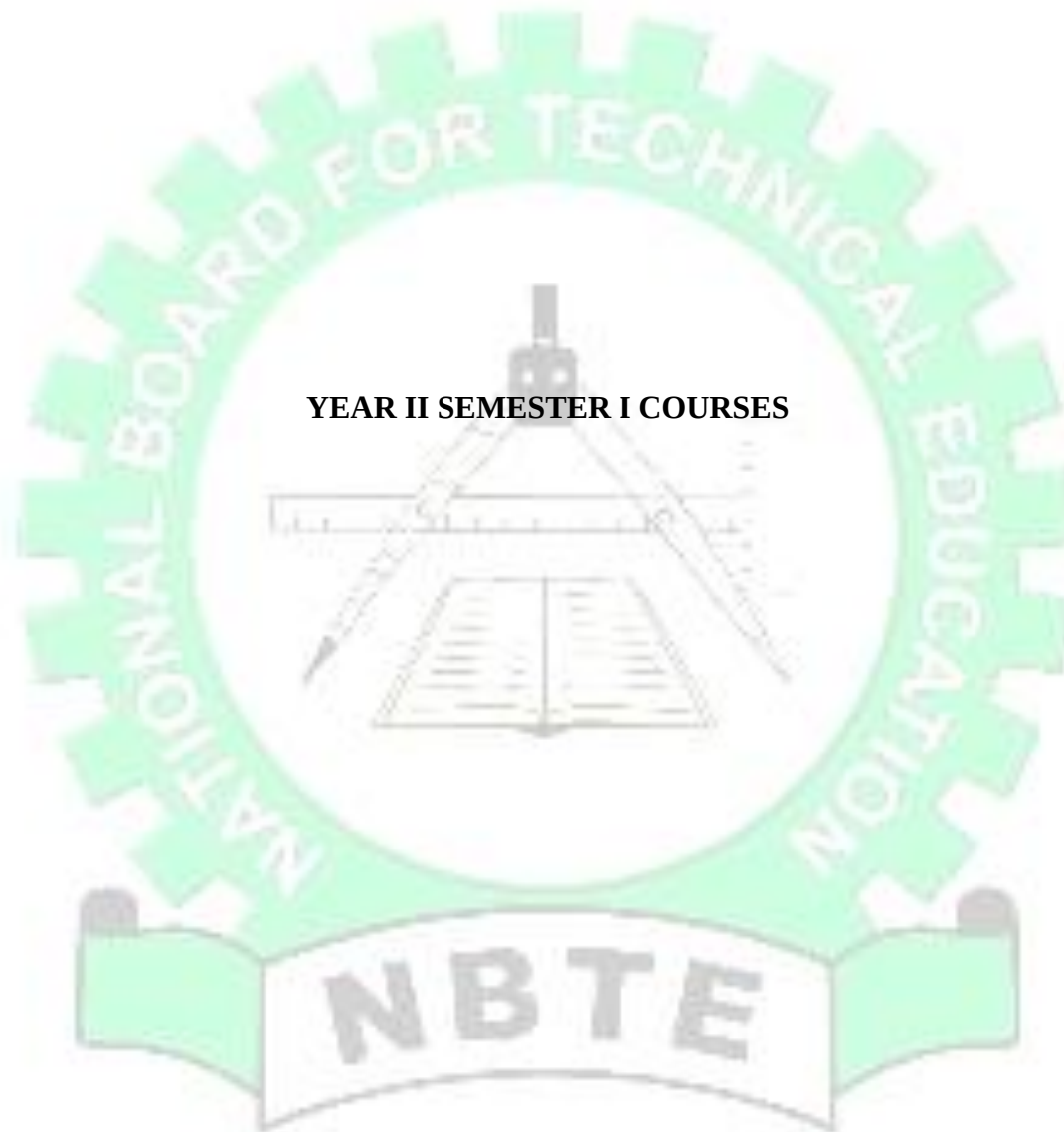
8-10				• Carry out weed identification and control. • Conduct pest scouting and disease monitoring activities. • Carry out preparation and application of botanical pest and disease control materials. • Practice field sanitation and removal of infected plant materials. • Keep pest and disease monitoring records.	Guide students to: • Carry out weed identification and control. • Conduct pest scouting and disease monitoring activities. • Prepare and apply botanical pest and disease control materials. • Practice field sanitation and removal of infected plant materials. • Keep pest and disease monitoring records.	Nursery tools, sprayers, neem materials and other botanicals, PPE, hand lens, field plots, practical manual, organic pesticide, traps etc.
General Objective 5.0: Know crop monitoring, growth assessment and field trial management practices						
11-12				• Conduct crop growth monitoring and field observation.	Guide students to: • Conduct crop growth monitoring	Measuring tools, notebooks,

				• Measure plant growth and yield performance. • Carry out crop trial comparison and field evaluation. • Practice simple field data collection, analysis and interpretation. • Keep all field records.	and field observation. • Measure plant growth and yield performance. • Carry out crop trial comparison and field evaluation. • Practice simple field data collection, analysis and interpretation. • Keep all field records.	observation sheets, field plots, PPE, practical manual, computer, smart phones etc.
General Objective 6.0: Know harvesting, yield assessment and post-harvest handling practices in organic system						
13-14				• Carry out harvesting operations for selected crops. • Conduct sorting and grading of harvested produce. • Measure crop yield and compare plot performance.	Guide students to: • Carry out harvesting operations for selected crops. • Conduct sorting and grading of harvested produce. • Measure crop	Harvesting tools and machines, weighing scale, baskets, field plots, storage sacks, other containers, record keeping

				• Carry out simple post-harvest handling practices. • Keep harvesting and yield records.	yield and compare plot performance. • Carry out simple post-harvest handling practices. • Keep harvesting and yield records.	equipment, PPE, practical manual, smart phones, wheel barrow, threshers, harvester etc.
General Objective 7.0: Know field documentation and farm record keeping practices						
15				• Keep field operation records. • Prepare simple field practical report. • Compile crop production and trial records. • Present field practical report.	Guide students to: • Keep field operation records. • Prepare simple field practical report. • Compile crop production and trial records. • Present field practical report.	Record keeping equipment, record sheets, notebooks, farm logbook, practical manual, computer, projector etc.

COURSE ASSESSMENT: Attendance – 10% Practical Performance – 50% Field Report/Logbook – 20% Examination/Viva – 20% Total = 100%						





YEAR II SEMESTER I COURSES

ORGANIC CROPS PRODUCTION III (TREE AND PLANTATION CROPS)

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC CROPS PRODUCTION III (TREE AND PLANTATION CROPS)	COURSE CODE: OCP 411	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in organic tree and plantation crop production, using sustainable, climate-smart, and environmentally friendly farming practices to improve productivity and soil health.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the origin, classification, characteristics, organic production practices and importance of tree crops; 2.0 Know the origin, classification, characteristics, organic production practices and importance of plantation crops; 3.0 understand post-harvest, handling, storage and marketing of tree and plantation crops in organic system; 4.0 Know climate-smart practices and record keeping in tree and plantation crops.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC CROPS PRODUCTION III (TREE AND PLANTATION CROPS)			COURSE CODE: OCP 411		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in organic tree and plantation crop production, using sustainable, climate-smart, and environmentally friendly farming practices to improve productivity and soil health						
GENERAL OBJECTIVE 1.0: Understand the origin, classification, characteristics, organic production practices and importance of tree crops.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-4	1.1 Explain the origin of tree crops e.g cocoa, kola, rubber, etc. 1.2 Explain the classification tree crops based on use and morphological characteristics. 1.3 Explain botanical characteristics of trees. 1.4 Discuss production and field management of tree crops in an organic system 1.5 Discuss economic and nutritional importance of tree crops.	- Discuss the origin of tree crops e.g cocoa, kola, rubber, etc. - Describe tree crops based on use and morphological characteristics. - Describe botanical characteristics of trees. - Explain production and field	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos, etc.	- Identify major tree crops grown locally. - Classify tree crops according to use and crop group. - Observe botanical characteristics of selected tree crops. - Prepare crop identification records and herbarium samples. - Carryout	Guide students to: - Identify major tree crops grown locally. - Classify tree crops according to use and crop group. - Observe botanical characteristics of selected tree crops. - Prepare crop identification records and herbarium samples. - Carryout production of some	Crop samples, seeds, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks, smartphones, PPE, practical

		management of tree crops in an organic system • Explain economic and nutritional importance of tree crops.		production of some selected tree crops • Prepare field production records	selected tree crops • Keep field production records	manual, etc.
General Objective 2.0: Know the origin, classification, characteristics, organic production practices and importance of plantation crops.						
5-8	2.1 Explain the origin of plantation crops e.g rice, sesame, sunflower, melon, etc. 2.2 Explain the classification of plantation crops based on use and morphological characteristics. 2.3 Explain botanical characteristics of plantation crops 2.4 Discuss production and field management of plantation crops in organic system. 2.5 Discuss economic and nutritional importance of plantation crops.	• Discuss the origin of plantation crops e.g rice, sesame, sunflower, melon, etc. • Describe plantation crops based on use and characteristics. • Describe botanical characteristics of plantation crops. • Explain production and field management of plantation crops in organic system. • Explain economic and nutritional importance of plantation crops.	Textbooks, journals, white/smart boards, internet, charts, projector, crop samples, videos, etc.	• Identify major plantation crops grown locally. • Classify plantation crops according to use. • Observe botanical characteristics of selected plantation crops. • Prepare crop identification records and herbarium samples. • Carry out production of some selected plantation crops. • Prepare field production	Guide students to: • Identify major plantation crops grown locally. • Classify plantation crops according to use. • Observe botanical characteristics of selected plantation crops. • Prepare crop identification records and herbarium samples. • Carry out production of some selected plantation crops. • Keep field	Crop samples, seeds, chain saw, planters, tractor, implements, power tillers, field plots, ICT tools, herbarium materials, hand lens, notebooks, smartphones, PPE, practical manual, etc.

				records	production records	
General Objective 3.0: Understand post-harvest, handling, storage and marketing of tree and plantation crops in organic system						
9-11	3.1 Explain crop maturity indices for tree and plantation crops 3.2 Describe harvesting methods and equipment in tree and plantation crop production 3.3 Explain handling, sorting and grading in tree and plantation crop production in an organic system 3.4 Explain packaging and storage in tree and plantation crop production in an organic system 3.5 Describe primary processing for each crop group in an organic system 3.6 Discuss marketing in tree and plantation crop production	• Discuss crop maturity indices for tree and plantation crops. • Explain harvesting methods and equipment in tree and plantation crop production. • Describe handling, sorting and grading in tree and plantation crop production in an organic system. • Describe packaging and storage in tree and plantation crop production. • Explain primary processing for each crop group in an organic system. • Explain marketing in tree and plantation crop production.	White/Smart boards, markers, textbooks, journals, internet, charts, projector, pest identification manuals, videos etc.	• Identify maturity indices in tree and plantation crops • Identify harvesting equipment in tree and plantation crops • Carry out harvesting and handling of tree and plantation crops • Carry out sorting and grading • Carry out threshing, winnowing and other processing operations according to organic standards. • Determine moisture content of selected crops before storage • Carry out packaging and storage of tree and plantation crops according to organic standards • Undertake market survey of tree and plantation crops	Guide students to: • Identify maturity indices in tree and plantation crops • Identify harvesting equipment in tree and plantation crops • Carry out harvesting and handling of tree and plantation crops • Carry out sorting and grading • Carry out threshing, winnowing and other processing operations according to organic standards. • Determine moisture content of selected crops before storage • Carry out packaging and	Threshers, storage bins, dryers, organic storage inputs, sprayers, Silo, warehouse, drying slabs, Smartphones PPE, practical manual, Harvesting tools, scales, grading tables, moisture meter, hermetic bags, open sacks, etc.

				• Prepare records of all the operations manually and digitally	storage of tree and plantation crops according to organic standards • Undertake market survey of tree and plantation crops • Keep records of all the operations manually and digitally	
General Objective 4.0: Know climate-smart practices and record keeping in tree and plantation crops.						
13-14	4.1 Explain climate-smart agricultural practices in trees and plantation crop production. 4.2 Discuss effects of climate change on trees and plantation crop production. 4.3 Discuss climate risk adaptation practices in field crop production. 4.4 Explain farm record keeping in tree and plantation crop production. 4.5 Explain the use of climate information for farm decision-making	• Discuss climate-smart trees and plantation crop production using local farming examples. • Explain climate change effects on trees and plantation crop production. • Discuss farm documentation and record keeping procedures. • Describe use of climate information for farm decision-making.	White/smart boards, markers, textbooks, journals, internet, climate-smart agriculture manuals, annual NIMET reports, charts, projector, videos, weather reports, farm record templates, etc.	• Carry out climate-smart demonstration for selected crops on already established plot. • Practice water-efficient irrigation and watering methods where applicable. • Interpret weather information accessed using smartphone weather applications. • Prepare climate-based planting calendar for selected trees and/or plantation crops. • Prepare farm records on planting date, weather	Guide students to: • Carry out climate-smart demonstration for selected crops on already established plot. • Practice water-efficient irrigation and watering methods where applicable. • Access and interpret weather information using smartphone weather applications. • Prepare climate-	GPS, Sensors, drones, robots, tractors, computer, irrigation materials, field plots, smartphones, weather apps, notebooks, farm record sheets, PPE, practical manual, crop production

			condition, input use and crop performance. • Practice farm documentation for trees and plantation crop production.	based planting calendar for selected trees and/or plantation crops. • Keep farm records on planting date, weather condition, input use and crop performance. • Practice farm documentation for trees and plantation crop production.	records, etc.
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%					

PEST AND DISEASE CONTROL IN ORGANIC SYSTEM

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: PEST AND DISEASE CONTROL IN ORGANIC SYSTEM	COURSE CODE: OCP 412	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in pest and disease control, integrated crop protection systems and sustainable pest and disease management for organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand pest control concepts and beneficial organisms in organic crop production; 2.0 Know pest identification, scouting and monitoring practices; 3.0 Know biological pest control agents and organic protection materials; 4.0 Know integrated organic pest protection practices; 5.0 Know trap installation, pest suppression and field sanitation practices; 6.0 Know disease causing organisms and their lifecycle; 7.0 Understand disease management in organic crop production.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: PEST AND DISEASE CONTROL IN ORGANIC SYSTEM			COURSE CODE: OCP 412		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: SEMESTER:			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in pest and disease control, integrated crop protection systems and sustainable pest and disease management for organic crop production.						
GENERAL OBJECTIVE 1.0: Understand organic pest control concepts and beneficial organisms in crop production						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1- 2	1.1 Define Pest with examples 1.2 Explain organic pest control concept and methods. 1.3 Discuss beneficial and harmful organisms in crop production. 1.4 Explain the classification of pest 1.5 Explain ecological balance in pest management. 1.6 Describe roles of natural enemies in pest suppression. 1.7 Explain importance of pest control in organic farming.	• Discuss pest and organic pest control concepts using crop examples. • Discuss classification of pest • Describe beneficial and harmful organisms. • Discuss ecological relationships in pest management.	Textbooks, journals, internet, charts, projector, videos, pest samples. etc.	• Identify beneficial and harmful organisms in field plots. • Classify pests and beneficial organisms according to type. • Observe predator-prey interactions on crop fields. • Prepare simple identification records.	Guide students to: • Identify beneficial and harmful organisms in field plots. • Classify pests and beneficial organisms according to type. • Observe predator-prey interactions on crop fields. • Prepare simple identification records.	Insect nets, sample containers, hand lens, field plots, pest samples, notebook, PPE, smartphone, practical manual, etc.

General Objective 2.0: Know pest identification, scouting and monitoring practices						
3-5	2.1 Explain pest identification principles. 2.2 Discuss pest scouting and monitoring methods. 2.3 Explain crop damage assessment practices. 2.4 Describe pest population monitoring methods. 2.5 Explain pest infestation indicators.	• Discuss pest identification principles • Explain pest monitoring using practical examples. • Describe pest scouting and crop inspection techniques. • Discuss crop damage indicators and monitoring practices.	Textbooks, journals, charts, projector, internet, videos, etc.	• Conduct routine pest scouting on field plots. • Identify pests affecting selected crops. • Collect insect pest samples to make album. • Carry out crop damage assessment exercises. • Count pest population of a known area and infestation levels. • Tag affected plants and pest occurrence points. • Keep pest scouting and monitoring records. • Compare pest incidences across plots.	Guide students to: • Conduct routine pest scouting on field plots. • Identify pests affecting selected crops. • Collect insect pest samples to make album. • Carry out crop damage assessment exercises. • Count pest population of a known area and infestation levels. • Tag affected plants and pest occurrence points. • Keep pest scouting and monitoring • Compare pest incidences across plots.	Field plots, hand lens, pest traps, notebooks, pest charts, microscope, practical manual, smartphone, PPE, etc.

General Objective 3.0: Know biological pest control agents and organic protection materials						
6-8	3.1 Explain biological control agents in crop protection. 3.2 Discuss botanical and other organic pest protection materials. 3.3 Explain preparation of organic pest management materials. 3.4 Describe safety practices in organic pest management. 3.5 Explain application procedures for biological control methods.	• Discuss biological control materials using practical examples. • Describe preparation of botanical pest control materials. • Discuss safety procedures in pest control practices. • Explain application procedures for biological control methods.	Textbooks, journals, internet, white/smart board, markers, charts, projector, videos, etc.	• Identify biological control agents used in crop production. • Prepare botanical pesticides using locally available materials. • Practice mixing and preparation of organic pest control solutions. • Calibrate sprayers for application. • Practice safe handling and application of organic protection materials. • Keep pest control management records.	Guide students to: • Identify biological control agents used in crop production. • Prepare botanical pesticides using locally available materials. • Practice mixing and preparation of organic pest control solutions. • Calibrate sprayers for application. • Practice safe handling and application of organic protection materials. • Keep pest control management records.	Botanicals, e.g neem materials, garlic, pepper etc. sprayers, PPE, smartphones, measuring containers, practical manual, etc.
General Objective 4.0: Know integrated pest protection practices						
9-11	4.1 Explain integrated organic pest protection practices.	• Discuss integrated pest protection	Textbooks, journals,	• Carry out integrated pest management	Guide students to: • Carry out	Field plots, sprayers,

	4.2 Discuss cultural, biological and mechanical pest control methods. 4.3 Explain preventive pest management practices. 4.4 Describe pest suppression strategies in organic farming.	using crop examples. • Describe pest management techniques. • Discuss preventive pest management and pest suppression strategies.	charts, projector, white/smart board, markers, internet, videos, etc.	practices on field plots. • Practice manual pest removal and suppression techniques. • Apply organic pest management materials on selected crops. • Conduct field sanitation for pest reduction. • Monitor effectiveness of pest control measures. • Keep pest management records.	integrated pest management practices on field plots. • Practice manual pest removal and suppression techniques. • Apply organic pest management materials on selected crops. • Conduct field sanitation for pest reduction. • Monitor effectiveness of pest control measures. • Keep pest management records.	PPE, farm tools, light traps, pheromones, smartphones, organic pesticides, sanitation materials, practical manual, etc.
General Objective 5.0: Know trap installation, pest suppression and field sanitation practices						
12-13	5.1 Explain pest trapping methods. 5.2 Discuss field sanitation practices in pest management. 5.3 Explain pest suppression and preventive practices. 5.4 Describe monitoring of trap	• Discuss trapping and sanitation practices using practical examples. • Demonstrate trap installation and monitoring	Textbooks, journals, charts, projector, internet, videos, etc.	• Install simple pest traps on field plots. • Monitor trap performance and pest captured. • Conduct sanitation and pest habitat removal	Guide students to: • Install simple pest traps on field plots. • Monitor trap performance and pest captured. • Conduct sanitation	Pest traps, field plots, sanitation materials, notebooks, practical manual,

	performance. 5.5 Discuss pest control documentation and records.	procedures. • Discuss preventive field management. • Discuss documentation and reporting procedures.		activities. • Practice preventive pest suppression measures. • Keep trap monitoring records.	and pest habitat removal activities. • Practice preventive pest suppression measures. • Keep trap monitoring records.	record sheets, field plots, pest monitoring charts, PPE, smartphones, etc.
General Objective 6.0: Know disease causing organisms and their lifecycle						
14	6.1 Explain disease in Organic crop production 6.2 Discuss the different types of disease-causing organisms and their lifecycle 6.3 Explain the factors influencing incidence of crop diseases 6.4 Explain the economic importance of crop diseases	• Discuss disease in Organic crop production • Explain the different types of disease-causing organisms and their lifecycle • Discuss the factors influencing incidence of crop diseases • Discuss the economic importance of crop diseases	Textbooks, journals, internet, charts, pictures, projector, white/smart boards, videos, etc.	• Identify plants showing disease symptoms on field plot. • Create a poster to describe the lifecycle of any disease-causing organisms. • Identify the plant part and stage of disease infestation• Prepare simple identification records.	Guide student to: • Identify plants showing disease symptoms on field plot • Describe the lifecycle of any disease-causing organisms • Identify the plant part and stage of disease infestation• Prepare simple identification records.	Field plots, Record sheets, PPE, smartphones, practical manual, etc.

GENERAL OBJECTIVE 7.0: Understand disease management in organic crop production

15	7.1 List the symptoms exhibited by major plant diseases. 7.2 Explain the disease control measures in organic crop production. 7.3 Explain disease suppression and preventive practices. 7.4 Discuss the significance of record keeping in disease management.	• Discuss disease in Organic crop production. • Explain the symptoms exhibited by major plant diseases. • Discuss the disease management and control measures in organic crop production.	Textbooks, journals, internet, charts, pictures, white/smart board, projector etc.	• Identified diseased plant of farm. • Carry out rouging of infested crop. • Collect botanicals for preparing material for disease control. • Demonstrate calibration of material for disease control. • Apply organic material on infested plot. • Keep plant disease management records.	• Demonstrate disease evaluation methods. • Guide students in preparing organic preparation using local materials. • Supervise practical exercises and provide corrections.	Botanicals, field plot, sprayers, Record sheets, PPE, Smartphones, practical manual etc.
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COURSE ASSESSMENT:

Course Work – 10%

Test/Assignments – 10%

Practical – 40%

Examination – 40%

Total = 100%

GREENHOUSE AND PROTECTED CROP PRODUCTION IN ORGANIC SYSTEMS

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: GREENHOUSE AND PROTECTED CROP PRODUCTION IN ORGANIC SYSTEMS	COURSE CODE: OCP 413	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in screen/green house and protected crop production systems for efficient and sustainable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Know screen/green house and protected crop production systems; 2.0 Understand greenhouse establishment and environmental management practices; 3.0 Know nursery and crop establishment practices under protected organic system; 4.0 Know irrigation, crop maintenance and productivity management practices in protected organic cultivation; 5.0 Understand pest, disease and sanitation management practices in protected systems; 6.0 Understand monitoring, productivity evaluation and record keeping practices in protected organic systems.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: GREENHOUSE AND PROTECTED CROP PRODUCTION IN ORGANIC SYSTEMS			COURSE CODE: OCP 413		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE: OCP 317, OCP 322		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in screen/green house and protected crop production systems for efficient and sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Know screen/greenhouse and protected crop production systems						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning OUTCOME	Teacher’s Activities	Resources
1-2	1.1 Explain screen/greenhouse and protected crop production systems. 1.2 Discuss screen/greenhouse, screen house and shade net systems. 1.3 Explain the importance of protected cultivation in crop production. 1.4 Describe components of screen/greenhouse systems. 1.5 Explain advantages and limitations of protected cultivation.	• Discuss screen/greenhouse systems using practical examples. • Explain screen/greenhouse models and protected structure components. • Discuss the importance of protected cultivation. Discuss the principles and establishment of	Textbooks, journals, internet, charts, projector, greenhouse, screenhouse, videos, models, etc.	• Identify screen/greenhouse and protected structure components. • Carry out visual inspection to differentiate between greenhouse and screenhouse structures. • Conduct inspection of greenhouse and screen house facilities. • Compare greenhouse and open field crop production systems. • Identify simple greenhouse component.	Guide students to: • Identify screen/greenhouse and protected structure components. Differentiate between greenhouse and screenhouse structures. • Conduct inspection of greenhouse and screen house facilities. • Compare greenhouse and open	Greenhouse facilities, screen house, shade net materials, notebooks, practical manual, PPE, smartphones, etc.

	1.6 Explain the principles and establishment of organic hydroponics system.	organic hydroponics system		• Maintain greenhouse and screenhouse observation records.	field crop production systems. • Identify simple greenhouse component. • Maintain greenhouse and screenhouse observation records. Visit to established organic hydroponics system.	
General Objective 2.0: Understand screen/greenhouse establishment and environmental management practices						
3-5	2.1 Explain screen/greenhouse establishment requirements. 2.2 Discuss environmental control in screen/greenhouse systems; temperature, humidity and ventilation management. 2.3 Describe environmental factors affecting protected crop production in screen/green house. 2.4 Explain maintenance requirements for organic screen/greenhouse systems.	• Discuss screen/greenhouse environmental management using practical examples. • Explain the environmental control practices in screen/green house. • Discuss organic screen/greenhouse maintenance requirements.	Textbooks, journals, internet, charts, projector, videos, etc.	• Conduct simple screen/greenhouse setup and arrangement. • Practice screen/greenhouse environmental monitoring. • Measure temperature and humidity in protected systems. • Carry out ventilation and shade adjustment in screen/green house. • Conduct greenhouse cleaning and maintenance activities. • Prepare screen/greenhouse	Guide students to: • Conduct simple screen/greenhouse setup and arrangement. • Practice screen/greenhouse environmental monitoring. • Measure temperature and humidity in protected systems. • Carry out ventilation and shade adjustment in screen/green house.	Thermometer, hygrometer, screen/greenhouse facilities, shade materials, cleaning tools, practical manual, PPE, smartphones, etc.

				environmental records.	• Conduct greenhouse cleaning and maintenance activities. • Prepare screen/greenhouse environmental records.	
General Objective 3.0: Know nursery and crop establishment practices under protected organic system						
6-8	3.1 Explain nursery practices under protected organic cultivation. 3.2 Discuss organic crop establishment requirements in greenhouse systems. 3.3 Explain organic seedling management practices under protected conditions. 3.4 Describe crop arrangement and spacing in protected systems.	• Discuss nursery practices under protected organic cultivation with relevant examples. • Explain organic crop establishment requirements in greenhouse systems. • Describe protected organic seedling production methods. • Discuss organic crop establishment practices.	Textbooks, journals, charts, projector, white/smart board, markers, internet, videos, etc.	• Prepare organically conformed nursery media and seed trays. • Sow seeds under greenhouse or screen house conditions. • Conduct watering, shading and general seedling maintenance. • Carry out transplanting in greenhouse and screenhouse. • Practice crop spacing and arrangement under protected organic systems. • Prepare nursery and transplanting records.	Guide students to: • Prepare organically conformed nursery media and seed trays. • Sow seeds under greenhouse or screen house conditions. • Conduct watering, shading and general seedling maintenance. • Carry out transplanting in greenhouse and screenhouse. • Practice crop spacing and arrangement under protected organic systems.	Nursery trays, seeds, seedlings, watering cans, sprinkler systems, greenhouse containers, shade materials, practical manual, PPE, smartphones, etc.

					• Prepare nursery and transplanting records.	
General Objective 4.0: Know irrigation, crop maintenance and productivity management practices in protected organic cultivation.						
9-11	4.1 Explain irrigation and watering practices in protected organic systems. 4.2 Discuss crop maintenance practices in protected organic cultivation. 4.3 Explain productivity improvement practices under protected organic systems. 4.4 Describe crop support and maintenance systems.	• Discuss irrigation and maintenance practices using practical examples. • Explain greenhouse and screenhouse crop management procedures. • Discuss productivity improvement practices under protected organic systems Discuss crop support and maintenance systems.	Textbooks, journals, charts, white/smart board, markers, projector, internet, videos, etc.	• Carry out irrigation and watering of organic greenhouse crops. • Practice organic nutrient application and mulching. • Conduct pruning, staking and crop support activities. • Carry out crop monitoring and maintenance practices. • Assess crop productivity under protected conditions. • Prepare operations records.	Guide students to: • Carry out irrigation and watering of organic greenhouse crops. • Practice organic nutrient application and mulching. • Conduct pruning, staking and crop support activities. • Carry out crop monitoring and maintenance practices. • Assess crop productivity under protected conditions. • Prepare operations records.	Irrigation kits/tools, watering cans, sprinkler systems, drip irrigation systems, mulch materials, stakes, ropes, PPE, smartphones, greenhouse crops, practical manual, etc.
General Objective 5.0: Know pest, disease and sanitation management practices in protected organic systems						
12-13	5.1 Discuss pest and disease control practices in protected organic system . 5.2 Discuss greenhouse sanitation	• Explain pest and disease management using organic	Textbooks, journals, charts, projector,	• Conduct pest and disease scouting in protected systems. • Carry out sanitation	Guide students to: • Conduct pest and disease	PPE, sprayers, sanitation materials,

	requirements. 5.3 Explain preventive pest and disease management practices. 5.4 Describe sanitation and hygiene requirements.	substances. - Describe sanitation and hygiene procedures. - Discuss preventive pest and disease management practices.	internet, white/smart board, markers, videos, etc.	and cleaning of protected organic systems. - Practice removal of infected and infested crop materials. - Apply organic pest and disease management materials. - Prepare protected systems sanitation records.	scouting in protected systems. - Carry out sanitation and cleaning of protected organic systems. - Practice removal of infected and infested crop materials. - Apply organic pest and disease management materials. - Prepare protected systems sanitation records.	organic pesticides, pest monitoring devices, screen/green house facilities, practical manual, smartphones, etc.
General Objective 6.0: Understand monitoring, productivity evaluation and record keeping practices in protected organic systems.						
14-15	6.1 Explain monitoring practices in protected organic systems. 6.2 Explain productivity evaluation in protected organic crop production. 6.3 Explain record keeping practices in protected organic	Discuss monitoring and evaluation methods in protected organic systems.	Textbooks, journals, charts, projector, white/smart board, markers,	- Conduct crop performance assessment in protected organic systems. - Prepare environmental and	Guide students to: Conduct crop performance assessment in protected organic systems.	Record sheets, notebooks, screen/green house data charts, practical

	systems.	• Discuss record keeping procedures. • Highlight the importance of record keeping and its relevance in productivity evaluation.	internet, etc.	crop records. • Conduct productivity comparison under organic protected and open field systems. • Prepare a simple protected systems crop production report.	• Prepare environmental and crop records. • Conduct productivity comparison under organic protected and open field systems. • Prepare a simple protected systems crop production report.	manual, smartphones, etc.
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%						

ORGANIC PASTURE AND FORAGE PRODUCTION

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC PASTURE AND FORAGE PRODUCTION	COURSE CODE: OCP 414	CONTACT HOURS: 2 HOURS/WEEK
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to provide students with knowledge and practical skills in organic pasture grasses and legumes establishment and management for livestock production in Nigeria.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the importance and types of pastures; 2.0 Know pasture grasses and their agronomy; 3.0 Know pasture legumes and their agronomy; 4.0 Know organic pasture establishment and management practices; 5.0 Understand pasture utilization and forage conservation (silage and hay).		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC PASTURE AND FORAGE PRODUCTION			COURSE CODE: OCP 414		CONTACT HOURS: 2 HOURS/WEEK	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with knowledge and practical skills in organic pasture grasses and legumes establishment and management for livestock production in Nigeria.						
GENERAL OBJECTIVE 1.0: Understand the importance and types of pastures						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Define pasture, range, forage, fodder, silage, hay 1.2 Describe the importance of pastures in livestock systems: dairy, beef, sheep, goat 1.3 Explain the different classes of pastures with examples: natural (rangelands), cultivated; sown, semi-sown 1.4 List different species of pasture grasses 1.5 Describe pasture distribution in Nigeria's agro-ecological zones 1.6 Explain the specific features and standards for organic pasture establishment	- Explain the following terms: pasture, range, forage, fodder, silage, hay; distinguish forage (fed) from fodder (cut and carried) - Discuss the importance of pastures in livestock systems: dairy, beef, sheep,	Pasture textbooks (Ruthenberg), Nigeria livestock atlas, agro-zone map, ILRI publications, projector, videos, white/smart board, marker, etc	- Identify 10 natural and 10 cultivated pasture species on campus or nearby rangeland. - Fabulate location and dominant species - Visit organic livestock farm. - Document the pasture system in use. - Assess animal nutrition adequacy.	Guide students to: - Identify natural and cultivated pasture species - Arrange visit, observation and assessment	Field site, identification key, hand lens, notebooks; livestock farm, samples of pasture grasses, observation guide, smartphone, etc

		goat, etc. • Discuss the classification of pastures: natural (rangelands), cultivated; sown, semi-sown, etc. • Describe different species of pasture grasses (e.g. elephant, guinea, gamba grasses, etc). • Explain pasture distribution in Nigeria's agro-ecological zones				
General Objective 2.0: Know pasture grasses and their agronomy						
4-6	2.1 Describe major tropical pasture grasses 2.2 Describe agronomic requirements: ecology, planting (seed, vegetative), spacing, fertilization in organic	• Discuss each major tropical pasture grasses <i>Panicum</i>	Pasture textbooks, ILRI/NAPRI variety brochures, , projector,	• Establish a 100 m ² <i>Panicum</i> maximum and <i>Pennisetum purpureum</i> pasture plot in an	Guide students to: • Establish a 100 m ² <i>Panicum</i> maximum and	School farm, <i>Panicum</i> and <i>Pennisetum</i> cuttings, organic fertilizer,

	system 2.3 Describe productivity: dry matter yield, regrowth, palatability 2.4 Describe weed management in organic pasture grasses	<i>maximum</i> (Guinea grass), <i>Brachiaria spp.</i> (Signal grass), <i>Andropogon gayanus</i>, <i>Pennisetum purpureum</i> (Elephant grass), <i>Cynodon dactylon</i> (Bermuda) according to morphology, ecology, palatability, key strengths • Discuss agronomic requirements: ecology, planting (seed, vegetative), spacing, fertilization • Discuss productivity	videos, white/smart board, marker, etc	organic system using vegetative cuttings; manage and measure DM yield at first cut (8–10 weeks) • Identify 5 major weed species in the established pasture. • Carry out control measures for the identified weeds • Prepare record of all activities	<i>Pennisetum purpureum</i> pasture plot in an organic system using vegetative cuttings; manage and measure DM yield at first cut (8–10 weeks) • Identify 5 major weed species in the established pasture; • Carry out control measures for the identified weeds • Prepare record of all activities	hoes, machete, weighing scale; weed identification key, hoes, herbicide, PPE, smartphones, etc.
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		: dry matter yield, regrowth, palatability • Discuss weed management in organic pastures				
General Objective 3.0: Know pasture legumes and their agronomy						
7-9	2.1 Describe major tropical pasture legumes: <i>Stylosanthes spp.</i> , <i>Centrosema pubescens</i> , <i>Calopogonium mucunoides</i> , <i>Mucuna pruriens</i> , <i>Lablab purpureus</i> 2.2 Describe biological N ₂ fixation by Rhizobium; its contribution to soil fertility 2.3 Describe agronomic requirements and management in organic pasture 2.4 Describe legume-grass mixtures and their advantages	• Describe each legume; growth habit, ecology, palatability, key features • Explain Rhizobium-legume symbiosis; nodulation; ~100–200 kg N/ha contribution; inoculation • Discuss planting (seed	Pasture textbooks, IITA/ILRI legume brochures, Rhizobium inoculant, school farm, projector, videos, white/smart board, marker, etc	• Establish a 50 m² Stylosanthes-Andropogon mixed pasture in an organic system. • Inoculate seeds with Rhizobium. • Record nodulation at 6 WAP • Measure dry matter yield and N content (laboratory or by calculation) of legume vs grass-only plot	Guide students to: • Establish a 50 m² Stylosanthes-Andropogon mixed pasture in an organic system. • Inoculate seeds with Rhizobium. • Record nodulation at 6 WAP • Measure dry matter yield and N content (laboratory	Stylosanthes seeds, Rhizobium inoculant, school farm, hoes; weighing scale, drying oven, calculator, PPE, smartphones, etc.

		scarification , depth), fertilization in organic pasture Explain mixtures: <i>Stylosanthes</i> - <i>Andropogon</i> , <i>Centrosema</i> -<i>Panicum</i>; advantages: balanced diet, fertility maintenance		or by calculation) of legume vs grass-only plot		
General Objective 4.0: Know organic pasture establishment and management						
10-12	4.1 Describe site selection, land preparation, seeding/planting, beating-up in organic pasture establishment 4.2 Describe pasture fertilization using organic fertilizer 4.3 Describe grazing management: rotational, continuous, deferred; stocking rate calculation	- Discuss site selection, land preparation, seeding/planting, beating-up - Explain fertilization using organic fertilizer	Pasture textbooks, ILRI grazing management publications, school farm pasture plot, projector, white /smart board, marker,	- Calculate stocking rate for a 5 ha pasture producing 10 t DM/ha given a TLU consumes 7 kg DM/day. - Recommend stocking rate. - Design a rotational grazing system on a	Guide students to: Calculate stocking rate for a 5 ha pasture producing 10 t DM/ha given a TLU consumes 7 kg DM/day.	Calculator, pasture data; pasture plot, fencing materials (where actual), grazing schedule template,

	4.4 Describe pasture rejuvenation: gap filling, top dressing, oversowing legumes	• Compare grazing systems. • Calculate stocking rate (TLU/ha) based on DM yield and animal requirement • Explain rejuvenation triggers; oversowing Stylosanthes into degraded grasslands	etc.	1 ha pasture (paper or actual) with 4 paddocks. • Calculate rest period	• Recommend stocking rate. • Design a rotational grazing system on a 1 ha pasture (paper or actual) with 4 paddocks; calculate rest period	organic fertilizer, PPE, smartphones, weighing scale, etc.
General Objective 5.0: Understand pasture utilization and forage conservation						
13-15	5.1 Describe pasture utilization: grazing, cut-and-carry, soiling 5.2 Describe silage making: principles, additives, types of silos (pit, trench, bag, tower) 5.3 Describe hay making: principles, drying methods, baling, storage 5.4 Describe quality assessment of silage and hay: colour, smell, pH, DM	• Discuss pasture utilization: grazing, cut-and-carry, soiling • Explain hay drying (sun) to <15% moisture;	Forage conservation textbooks, polythene sheets (for bag silo), molasses, baling tools, school farm or partnered livestock farm, projector, white/smart	• Make 50 kg of silage from cut Pennisetum or maize from organic system using a polythene-bag silo. • Assess quality after 4 weeks (pH, colour, smell). • Make hay from 50 kg cut Andropogon or Panicum from	Guide students to: • Make 50 kg of silage from cut Pennisetum or maize from organic system using a polythene-bag silo; assess quality after	Cut forage (Pennisetum or maize), molasses, polythene bag/drum, weighing scale, pH meter; cut grass, drying area, baling tools, dry

		baling; storage in dry shed. • Discuss hay making: principles, drying methods, baling, storage. • Explain quality assessment of silage and hay: colour, smell, pH, DM.	board, marker, etc.	organic system. • Sun-dry for 3 days. • Bale by hand. • Store. • Assess quality.	4 weeks (pH, storage colour, smell). • Make hay from 50 kg cut Andropogon or Panicum from organic system; sun-dry for 3 days; bale by hand; store; assess quality.	
COURSE ASSESSMENT: Attendance: 10% Test/Assignments: 10% Practical 40% Examination: 40% Total: 100%						

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: AGROECOLOGY AND SUSTAINABLE FARMING SYSTEMS	COURSE CODE: OCP 415	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in agroecology and sustainable farming systems for environmentally friendly, climate-smart and productive organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the principles and concepts of agroecology; 2.0 Understand biodiversity and agroecosystem management practices in farming systems; 3.0 Know sustainable farming systems and ecological crop production practices; 4.0 Understand conservation and climate-smart farming practices; 5.0 Know farm planning and sustainable resource management practices.		

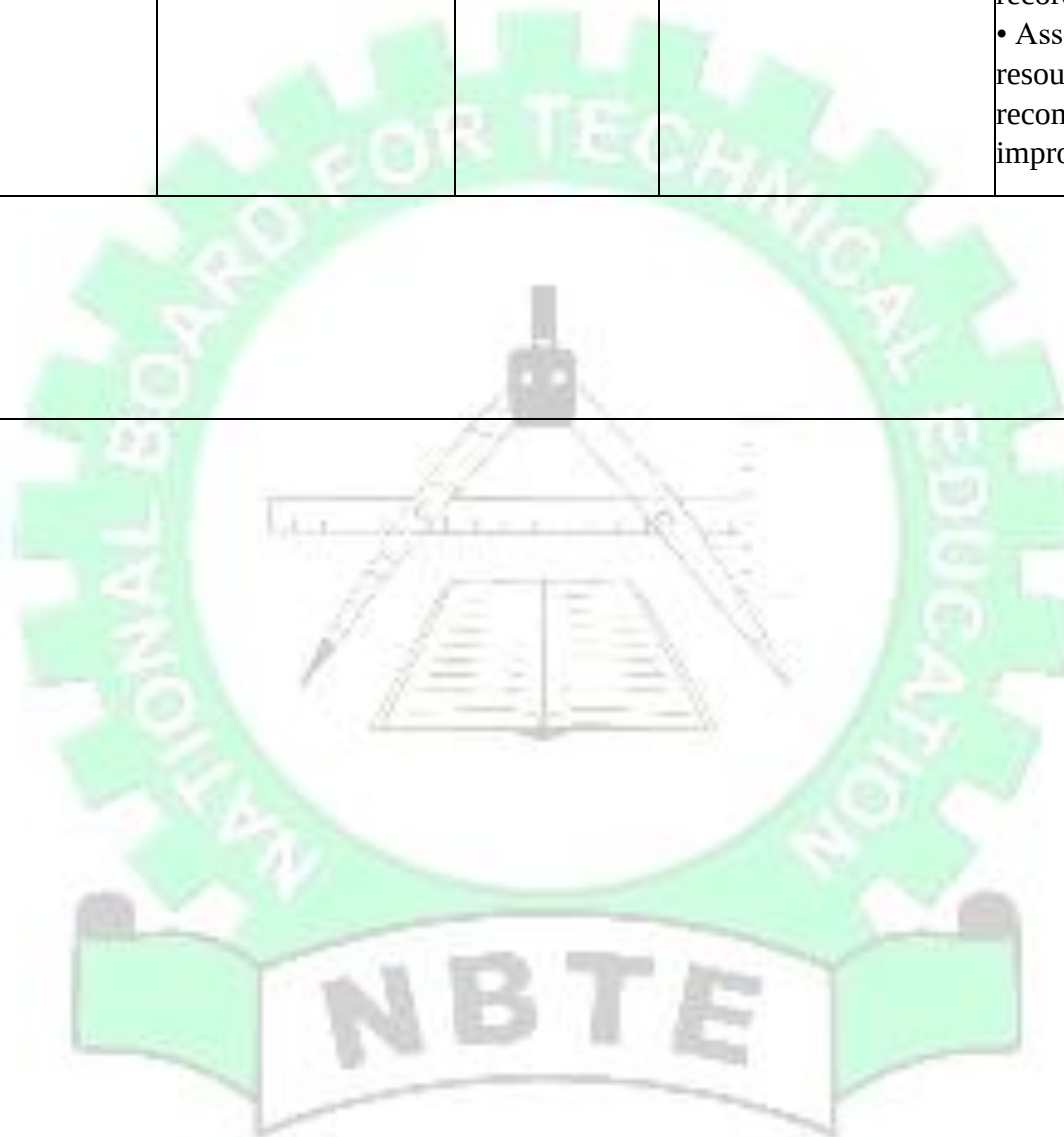
PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: AGROECOLOGY AND SUSTAINABLE FARMING SYSTEMS				COURSE CODE: OCP 415		CONTACT HOURS: 3HOURS/WEEK
				CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I				PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in agroecology and sustainable farming systems for environmentally friendly, climate-smart and productive organic crop production.						
GENERAL OBJECTIVE 1.0: Understand principles and concepts of agroecology						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Define agroecology 1.2 Explain agroecology and its importance in crop production. 1.3 Describe principles of agroecology. 1.4 Mention the components of agroecosystems. 1.5 Describe relationships among the components of agroecosystem (crops, soil, organisms and environment). 1.6 Explain ecological interactions in farming systems.	•Explain agroecology • Discuss agroecology concepts using local farming examples. • Discuss the principles of agroecology. • Discuss the components of agroecosystem. • Discuss the relationships among the components of agroecosystem (crops, soil, organisms and	Textbooks, journals, internet, charts, projector, videos, white/smart board, markers, etc.	• Identify components of agroecosystems on field plots. • Carry out agroecosystem field observation. • Observe interactions among crops, insects and soil organisms. • Prepare simple agroecosystem sketch/map. • Prepare agroecology observation records.	Guide students to: • Identify components of agroecosystems on field plots. • Carry out agroecosystem field observation. • Observe interactions among crops, insects and soil organisms. • Prepare simple agroecosystem	Field plots, notebooks, farm map sheets, smartphones PPE, insect samples, magnifying lens, practical manual, etc.

		environment).			sketch/map. • Prepare agroecology observation	
General Objective 2.0: Understand biodiversity and agroecosystem management practices in farming systems						
4-6	2.1 Explain biodiversity and its importance in sustainable agriculture. 2.2 Discuss beneficial organisms in farming systems. 2.3 Explain ecosystem services in crop production. 2.4 Describe biodiversity conservation practices in farming systems. 2.5 Explain ecological balance in sustainable farming.	• Discuss biodiversity concepts using practical examples. • Describe beneficial organisms and ecological balance. • Describe agroecosystem services in farming systems. • Discuss ecological balance in sustainable farming.	Textbooks, journals, charts, videos, internet, projector, white/smart board, markers, etc.	• Identify beneficial insects and organisms on farms. • Carry out biodiversity assessment on field plots. • Classify beneficial and harmful organisms. • Establish biodiversity-supporting field practices. • Practice habitat protection measures on farm. • Prepare biodiversity observation records.	Guide student to: • Identify beneficial insects and organisms on farms. • Carry out biodiversity assessment on field plots. • Classify beneficial and harmful organisms. • Establish biodiversity-supporting field practices. • Practice habitat protection measures on farm. • Keep biodiversity observation records.	Field plots, insect samples, hand lens, farm tools, smartphones, PPE, observation sheets, practical manual, etc.
General Objective 3.0: Know sustainable farming systems and ecological crop production practices						

7-9	3.1 Explain sustainable farming systems in crop production. 3.2 Explain ecological crop production practices 3.3 Outline the benefits of sustainable farming systems. 3.4 Explain nutrient recycling in farming systems.	• Discuss sustainable farming systems using practical examples. • Discuss ecological crop production practices (e.g intercropping, crop rotation, mixed farming systems, etc). • Discuss the benefits of sustainable farming systems. • Discuss nutrient recycling in farming systems.	Textbooks, journals, internet, charts, videos, white/smart board, markers, projector, etc.	• Practice crop rotation planning. • Carry out field layout activities. • Establish simple intercropping demonstration plots. • Practice nutrient recycling using crop residues. • Carry out sustainable farm management practices e.g. IPM, agroforestry system, regenerative agriculture, etc. • Prepare field management records.	Guide students to: • Carry out field layout activities. • Establish simple intercropping demonstration plots. • Practice nutrient recycling using crop residues. • Carry out sustainable farm management practices e.g. IPM, agroforestry system, regenerative agriculture, etc. • Keep field management records.	Crop seeds, field plots, ropes, pegs, measuring tapes, crop residues, farm tools, PPE, smartphones, practical manual, etc.
General Objective 4.0: Understand conservation and climate-smart farming practices						
10-12	4.1 Explain conservation agriculture practices. 4.2 Discuss climate-smart farming practices. 4.3 Explain soil and water conservation measures. 4.4 Describe adaptation practices for climate variability.	• Describe conservation and climate-smart practices using practical examples. • Discuss soil and water conservation methods. • Discuss adaptation	Textbooks, journals, charts, projector, videos, white/smart board, internet, etc.	• Carry out mulching and moisture conservation practices. • Practice water conservation measures on field plots. • Establish soil conservation demonstration practices.	Guide students to: • Carry out mulching and moisture conservation practices. • Practice water conservation measures on field	Mulching materials, watering cans, hoes, rake, field plots, smartphones, PPE, farm tools,

	4.5 Explain sustainable land management practices.	practices for sustainable farming.		• Carry out erosion control activities. • Practice climate-smart field management. • Prepare conservation activity records.	plots. • Establish soil conservation demonstration practices. • Carry out erosion control activities. • Practice climate-smart field management. • Prepare conservation activity records.	practical manual, etc.
General Objective 5.0: Know farm planning and sustainable resource management practices						
13-15	5.1 Explain farm planning principles in sustainable farming systems. 5.2 Discuss sustainable use of farm resources. 5.3 Describe resource conservation measures.	• Discuss farm planning concepts using practical examples. • Explain sustainable farm resource use and management. • Discuss resource conservation measures.	Textbooks, journals, charts, projector, smart/white board, markers, videos, internet, etc.	• Prepare simple sustainable farm layout plan. • Carry out resource mapping on field plots. • Practice sustainable farm management activities. • Prepare sustainable resource management records. • Assess farm resource use and recommend improvements.	Guide students to: • Prepare simple sustainable farm layout plan. • Carry out resource mapping on field plots. • Practice sustainable farm management activities. • Prepare sustainable resource management	Farm layout sheets, field plots, notebooks, mapping tools, smartphones, PPE, farm tools, practical manual, etc.

					records. • Assess farm resource use and recommend improvements.	
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COURSE ASSESSMENT:**Course Work:** 10%**Test/Assignments:** 10%**Practical:** 40%**Examination:** 40%**Total:** 100%

FIELD PRACTICAL II: ORGANIC CROP MONITORING AND CERTIFICATION COMPLIANCE

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: FIELD PRACTICAL II: ORGANIC CROP MONITORING AND CERTIFICATION COMPLIANCE	COURSE CODE: OCP 416	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL:
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEK
GOAL: This course is designed to equip students with practical skills in crop monitoring, organic farm inspection, certification compliance and field documentation for sustainable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Know crop growth monitoring and field assessment practices; 2.0 Know pest, disease and nutrient deficiency monitoring practices; 3.0 Know irrigation, crop maintenance and productivity monitoring practices in organic system; 4.0 Know organic certification compliance and farm inspection practices; 5.0 Know traceability, documentation and compliance record keeping practices in organic system.		

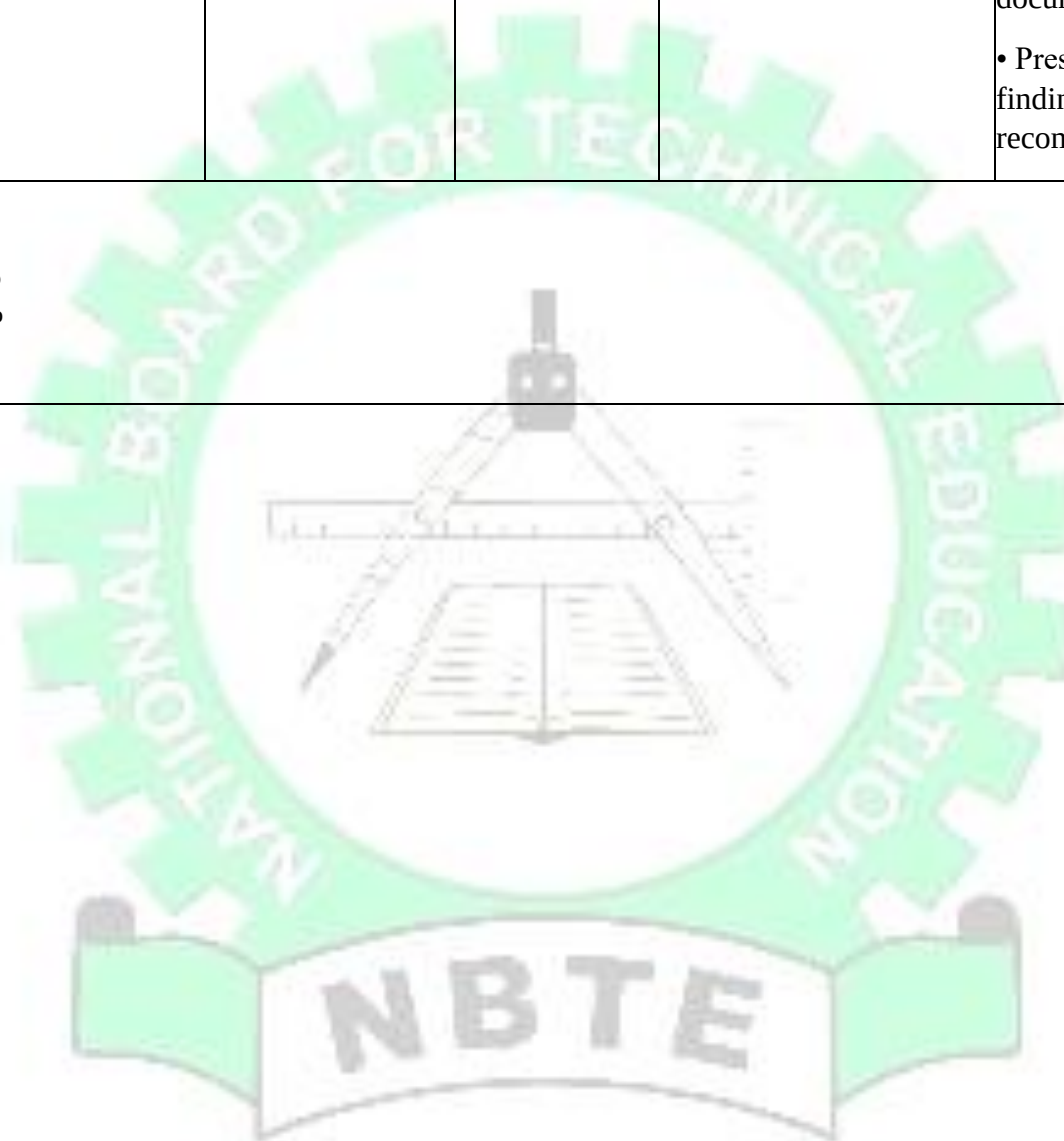
PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: FIELD PRACTICAL II: ORGANIC CROP MONITORING AND CERTIFICATION COMPLIANCE			COURSE CODE: OCP 416		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 0	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with practical skills in crop monitoring, organic farm inspection, certification compliance and field documentation for sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Know crop growth monitoring and field assessment practices						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2				• Conduct routine crop growth monitoring on field plots. • Measure plant height, canopy spread and crop vigour. • Carry out crop stand count and spacing assessment. • Assess crop growth performance on field plots. • Prepare crop monitoring records.	Guide students to: • Conduct routine crop growth monitoring on field plots. • Measure plant height, canopy spread and crop vigour. • Carry out crop stand count and spacing assessment. • Assess crop growth performance on field plots.	Measuring tools, smartphones, tablets, meter rule, observation sheets, field plots, notebooks, practical manual, etc.

					• Prepare crop monitoring records.	
General Objective 2.0: Know pest, disease and nutrient deficiency monitoring practices						
5-8				• Conduct pest and disease scouting on field plots. • Identify pest damage and disease symptoms. • Assess nutrient deficiency symptoms in crops. • Carry out pest incidence and disease severity assessment. • Prepare pest, disease and nutrient monitoring records.	Guide students to: • Conduct pest and disease scouting on field plots. • Identify pest damage and disease symptoms. • Assess nutrient deficiency symptoms in crops. • Carry out pest incidence and disease severity assessment. • Prepare pest, disease and nutrient monitoring records.	Hand lens, field plots, pest charts, nutrient deficiency charts, notebooks, practical manual, PPE, smartphones, etc.
General Objective 3.0: Know irrigation, crop maintenance and productivity monitoring practices						
6-8				• Conduct irrigation and watering activities on crop plots. • Carry out mulching and moisture conservation practices.	Guide students to: • Conduct irrigation and watering activities on crop plots. • Carry out mulching	Watering cans, mulch materials, stakes, ropes, farm tools, soil moisture

				• Practice pruning, staking (where necessary) and crop maintenance. • Monitor crop productivity and performance. • Prepare crop maintenance records.	and moisture conservation practices. • Practice pruning, staking (where necessary) and crop maintenance. • Monitor crop productivity and performance. • Prepare crop maintenance records.	sensors, smart phones, practical manual, etc.
General Objective 4.0: Know organic certification compliance and farm inspection practices						
9-12				• Conduct farm inspection using organic standards checklist. • Prepare field practical and compliance report. • Assess farm compliance with certification requirements. • Identify compliance and non-compliance practices on farms. • Carry out mock organic inspection exercise.	Guide students to: • Conduct farm inspection using organic standards checklist. • Prepare field practical and compliance report. • Assess farm compliance with certification requirements. • Identify compliance and non-	Compliance checklist, certification forms, field plots, notebooks, tablets, Organic Standards Manual, Audit forms, practical manual, smartphones, etc.

				• Prepare certification compliance records.	compliance practices on farms. • Carry out mock organic inspection exercise. • Prepare certification compliance records.	
General Objective 5.0: Know traceability, documentation and compliance record keeping practices.						
13-15				• Carry out traceability procedure • Prepare farm traceability and compliance records. • Practice labelling and documentation of farm produce. • Carry out farm input-output documentation exercise. • Keep certification records. • Prepare compliance documentation. • Present practical findings and recommendations.	Guide students to: • Carry out traceability procedure • Prepare farm traceability and compliance records. • Practice labelling and documentation of farm produce. • Carry out farm input-output documentation exercise. • Keep certification records. • Prepare compliance	Record sheets, labels, notebooks, certification forms, smartphones, Internet, Audit forms, relevant software applications, practical manual, etc.

					documentation. • Present practical findings and recommendations.	
COURSE ASSESSMENT: Attendance – 10% Practical Performance – 50% Field Report/Logbook – 20% Examination/Viva – 20% Total = 100%						





YEAR II SEMESTER II COURSES

ORGANIC FOOD SAFETY, QUALITY ASSURANCE AND EXPORT STANDARDS

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC FOOD SAFETY, QUALITY ASSURANCE AND EXPORT STANDARDS	COURSE CODE: OCP 421	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in food safety, quality assurance and export standard compliance for organic crop produce/products.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand food safety and quality assurance principles in organic system; 2.0 Know hygiene, sanitation and contamination prevention practices in organic system; 3.0 Know quality assessment and quality control practices for organic produce; 4.0 Know packaging, labelling and export compliance practices in organic system; 5.0 Understand traceability, documentation and export standard practices in organic system; 6.0 Know quality evaluation, compliance inspection and reporting practices for organic produce.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC FOOD SAFETY, QUALITY ASSURANCE AND EXPORT STANDARDS			COURSE CODE: OCP 421		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in food safety, quality assurance and export standard compliance for organic crop produce/products.						
GENERAL OBJECTIVE 1.0: Understand food safety and quality assurance principles in organic system						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2	1.1 Explain food safety principles in organic crop production. 1.2 Explain quality assurance systems in food production. 1.3 Explain food contamination risks in crop production. 1.4 Describe importance of quality assurance in organic farming. 1.5 Explain food safety requirements for export markets.	• Discuss food safety principles using crop production examples. •Discuss quality assurance systems in food production. • Discuss contamination risks and quality requirements. • Discuss	Textbooks, journals, internet, white/smart boards, makers, charts, projector, videos, etc.	• Identify food safety hazards in organic crop production systems. • Conduct food safety inspection exercise on organic farm produce. • Compare safe and unsafe produce handling practices. • Carry out contamination risk assessment exercise. • Prepare food safety observation records.	Guide students to: • Identify food safety hazards in organic crop production systems. • Conduct food safety inspection exercise on organic farm produce. • Compare safe and unsafe produce handling practices. • Carry out contamination risk assessment exercise.	Crop samples, PPE, inspection checklist, smartphones, PPE, notebooks, practical manual, etc.

		quality assurance practices. Explain food safety requirements for export markets.			• Prepare food safety observation records.	
General Objective 2.0: Know hygiene, sanitation and contamination prevention practices in organic system						
3-5	2.1 Explain hygiene and sanitation requirements in organic food handling. 2.2 Highlight contamination prevention practices. 2.3 Explain safe handling requirements for organic produce. 2.4 Explain hygiene standards for organic food safety. 2.5 Explain sanitation procedures for produce handling.	• Discuss hygiene and sanitation practices using practical examples. • Discuss produce handling and sanitation procedures. • Discuss contamination prevention practices. Describe hygiene standards for organic food	Textbooks, journals, charts, smart/white boards, marker, projector, internet, videos, etc.	• Conduct hygiene inspection of produce handling areas. • Practice sanitation procedures for handling equipment. • Carry out safe produce handling activities. • Identify contamination risks in handling systems. • Practice the use of PPE and hygiene compliance. • Prepare sanitation and hygiene records.	Guide students to: • Conduct hygiene inspection of produce handling areas. • Practice sanitation procedures for handling equipment. • Carry out safe produce handling activities. • Identify contamination risks in handling systems. • Practice the use of PPE and hygiene compliance. • Keep sanitation and hygiene records.	PPE, sanitation materials, crop produce, handling equipment, smartphones, practical manual etc.

		safety. Discuss sanitation procedures for produce handling				
General Objective 3.0: Know quality assessment and quality control practices for organic produce						
6-8	3.1 Explain quality assessment practices for organic produce. 3.2 Describe quality control systems in crop production. 3.3 Explain grading and sorting requirements for produce. 3.4 Describe quality indicators in crop products.	• Explain quality assessment practices for organic produce. • Describe quality control systems in crop production. • Explain grading and sorting requirements for produce.	Textbooks, journals, charts, white/smart boards, projector, internet, videos, etc.	• Conduct produce quality assessment exercise. • Carry out grading and sorting of organic produce. • Identify quality defects and non-compliance issues. • Compare produce quality standards for selected crops. • Practice quality checklist uses for produce assessment. • Keep quality control records.	Guide students to: • Conduct produce quality assessment exercise. • Carry out grading and sorting of organic produce. • Identify quality defects and non-compliance issues. • Compare produce quality standards for selected crops. • Practice quality checklist uses for produce assessment. • Keep quality control records.	Organic produce samples, grading trays, quality checklist, notebooks, smartphones, PPE, practical manual, etc.

		Describe quality indicators in crop products.				
General Objective 4.0: Describe packaging, labelling and export compliance practices in organic system						
9-11	4.1 Explain packaging requirements for organic produce. 4.2 Explain labelling standards in organic produce marketing. 4.3 Explain export compliance requirements for crop produce. 4.4 Describe packaging materials and standards.	- Discuss packaging and export requirements for organic produce using practical examples. - Discuss labelling and packaging procedures. - Discuss packaging materials and standards. - Discuss export compliance practices.	Textbooks, journals, charts, projector, smart/white boards, internet, videos, etc.	- Practice packaging of selected organic produce. - Prepare produce/products labels according to standards. - Practice labelling of packaged organic produce. - Conduct packaging quality inspection exercise. - Assess packaging materials for export suitability. - Practice compliance checklist use for export preparation. - Prepare packaging and labelling records.	Guide students to: - Practice packaging of selected organic produce. - Prepare produce/products labels according to standards. - Practice labelling of packaged organic produce. - Conduct packaging quality inspection exercise. - Assess packaging materials for export suitability. - Practice compliance checklist use for export preparation. - Keep packaging	Packaging materials, labels, crop produce, export checklist, smartphones, PPE, practical manual, etc.

					and labelling records.	
General Objective 5.0: Know traceability, documentation and export standard practices in organic system						
12-13	5.1 Explain traceability systems in organic produce marketing. 5.2 Explain export standards for organic produce. 5.3 Highlight documentation requirements for export markets. 5.4 Describe produce tracking and compliance systems.	• Discuss traceability and export standards using practical examples. • Describe export standards for organic produce • Discuss produce documentation systems. • Discuss export compliance procedures. • Explain produce tracking and compliance systems.	Textbooks, journals, charts, white/smart board, markers, projector, internet, videos, etc.	• Prepare traceability records for selected produce. • Practice produce tracking and documentation exercises. • Conduct export compliance documentation exercise. • Compare export standard requirements for selected produce. • Prepare export documentation records.	Guide students to: • Prepare traceability records for selected produce. • Practice produce tracking and documentation exercises. • Conduct export compliance documentation exercise. • Compare export standard requirements for selected produce. • Keep export documentation records.	Traceability forms, export documents, crop produce, notebooks, smartphones, PPE, practical manual, etc.
General Objective 6.0: Understand quality evaluation, compliance inspection and reporting practices for organic produce						

14-15	6.1 Explain quality evaluation practices for organic produce. 6.2 Explain compliance inspection procedures. 6.3 Highlight importance of food safety reporting. 6.4 State reporting and documentation procedures	• Discuss quality evaluation practices for organic produce. • Describe compliance inspection using practical examples. • Discuss importance of food safety reporting. • Discuss reporting and documentation procedures.	Textbooks, journals, charts, smart/white board, markers, projector, internet, etc.	• Conduct mock food safety and compliance inspection for organic produce. • Evaluate produce quality against standard requirements. • Prepare simple quality assurance and compliance report. • Compile food safety and export standard records.	Guide students to: • Conduct mock food safety and compliance inspection for organic produce. • Evaluate produce quality against standard requirements. • Prepare simple quality assurance and compliance report. • Compile food safety and export standard records.	Inspection checklist, crop produce, record sheets, smartphones, PPE, practical manual, etc.
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COURSE ASSESSMENT:

Course Work – 10%

Test/Assignments – 10%

Practical – 40%

Examination – 40%

Total = 100%

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC PRODUCE PROCESSING, PACKAGING AND VALUE ADDITION	COURSE CODE: OCP 422	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in organic produce processing, packaging and value addition for improved quality and marketability of organic crop products.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the principles of organic produce processing and value addition; 2.0 Know organic produce preparation, sorting and grading practices for processing; 3.0 Know organic produce processing and preservation practices; 4.0 Know packaging, labelling and branding practices for processed organic produce; 5.0 Understand quality control and storage practices for processed organic produce; 6.0 Understand value addition, product evaluation and record keeping practices for organic produce.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC PRODUCE PROCESSING, PACKAGING AND VALUE ADDITION			COURSE CODE: OCP 422		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in organic produce processing, packaging and value addition for improved quality and marketability of organic crop products.						
GENERAL OBJECTIVE 1.0: Understand the principles of organic produce processing and value addition						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2	1.1 Explain principles of organic produce processing. 1.2 State value addition opportunities and challenges in processing organic products. 1.3 Explain importance of processing in reducing post-harvest losses. 1.4 Describe processing requirements for organic produce. 1.5 Explain benefits of value addition in organic farming.	• Discuss produce processing using practical examples. • Explain value addition opportunities in organic farming. • Discuss produce handling requirements for processing. •Discuss the role of processing in minimizing post-	Textbooks, journals, internet, charts, white/smart boards, marker, projector, videos, etc.	• Identify produce suitable for processing and value addition. • Compare raw and processed organic products. • Conduct produce inspection before processing. • Carry out simple produce preparation activities. • Prepare produce processing observation records.	Guide students to: • Identify produce suitable for processing and value addition. • Compare raw and processed organic products. • Conduct produce inspection before processing. • Carry out simple produce preparation activities. • Keep produce	Organic produce samples, preparation tools, smartphones, inspection checklist, PPE, practical manual, etc.

		harvest losses. • Highlight the benefits of value addition in organic farming.			processing observation records.	
General Objective 2.0: Know produce preparation, sorting and grading practices for processing						
3-5	2.1 Explain produce preparation practices for processing. 2.2 Discuss sorting and grading requirements for organic produce. 2.3 Explain produce cleaning and handling practices. 2.4 Describe produce selection standards for processing.	• Explain produce preparation using practical examples. • Describe sorting and grading procedures. • Discuss produce cleaning and handling practices. • Discuss produce selection standards for processing.	Textbooks, journals, charts, projector, white/smart board, marker, internet, videos, etc.	• Practice trimming and produce preparation for processing. • Conduct produce cleaning and washing exercise. • Carry out sorting and grading of selected produce. • Identify defective and acceptable produce. • Prepare produce for selected processing methods. • Prepare sorting and grading records.	Guide students to: • Practice trimming and produce preparation for processing. • Conduct produce cleaning and washing exercise. • Carry out sorting and grading of selected produce. • Identify defective and acceptable produce. • Prepare produce for selected processing methods. • Prepare sorting and grading records.	Organic produce, grading trays, smartphone, washing materials, knives, PPE, practical manual, etc.

General Objective 3.0: Know organic produce processing and preservation practices						
6-8	3.1 Describe processing methods for organic produce. 3.2 Highlight preservation methods for crop products. 3.3 Explain drying, dehydration and storage requirements. 3.4 Describe quality preservation in processed produce.	• Discuss produce processing using practical examples. • Describe preservation and processing methods. • Discuss drying, dehydration and storage requirements. • Explain produce quality maintenance practices.	Textbooks, journals, charts, projector, white/smart board, marker, internet, videos, etc.	• Carry out simple produce processing activities. • Practice drying and dehydration of selected produce. • Conduct preservation of organic produce using suitable methods. • Prepare simple value-added products from selected crops. • Assess processing quality and product acceptability. • Prepare produce processing records.	Guide students to: • Carry out simple produce processing activities. • Practice drying and dehydration of selected produce. • Conduct preservation of organic produce using suitable methods. • Prepare simple value-added products from selected crops. • Assess processing quality and product acceptability. • Prepare produce processing records.	Drying trays, processing tools and equipment, crop produce, smartphones, packaging containers, PPE, practical manual, etc.
General Objective 4.0: Know packaging, labelling and branding practices for processed produce						
9-11	4.1 Explain packaging requirements for processed produce. 4.2 Discuss labelling and branding procedures and requirements.	• Discuss packaging and branding using practical examples.	Textbooks, journals, charts, projector, internet, white/smart	• Package processed organic produce using suitable materials. • Prepare labels for processed products.	Guide students to: • Package processed organic produce using	Packaging materials, labels, smartphones, processed

	4.3 Explain packaging materials and standards. 4.4 Describe branding practices for organic produce.	• Describe labelling, branding and packaging procedures and requirements. • Discuss branding practices for market acceptance.	board, marker, videos, etc.	• Conduct packaging quality assessment exercise. • Carry out branding and product presentation activities. • Compare packaging materials for selected products. • Prepare packaging and branding records.	suitable materials. • Prepare labels for processed products. • Conduct packaging quality assessment exercise. • Carry out branding and product presentation activities. • Compare packaging materials for selected products. • Prepare packaging and branding records.	produce, branding sheets, PPE, practical manual, etc.
General Objective 5.0: Know quality control and storage practices for processed produce						
12-13	5.1 Explain quality control practices for processed produce. 5.2 Discuss storage requirements for processed produce. 5.3 Explain shelf-life management practices. 5.4 Explain quality preservation in storage.	• Discuss quality control and storage using practical examples. • Describe storage and shelf-life assessment procedures.	Textbooks, journals, charts, projector, white/smart board, marker, internet, videos, etc.	• Conduct quality assessment of processed produce. • Practice storage arrangement for processed products. • Monitor simple shelf-life characteristics of products.	Guide students to: • Conduct quality assessment of processed produce. • Practice storage arrangement for processed products. • Monitor simple shelf-life	Storage containers, processed produce, quality checklist, PPE, smartphones, practical

		• Discuss quality maintenance practices.		• Identify spoilage indicators in stored products. • Prepare quality control and storage records.	characteristics of products. • Identify spoilage indicators in stored products. • Keep quality control and storage records.	manual, etc.
General Objective 6.0: Understand value addition, product evaluation and record keeping practice						
14-15	6.1 Explain value addition evaluation practices. 6.2 Enumerate processed produce documentation requirements. 6.3 Highlight importance of processing records.	• Describe product evaluation using practical examples. • Explain produce documentation and record keeping. • Enumerate the importance of processing records.	Textbooks, journals, charts, projector, white/smart board, marker, internet etc.	• Evaluate value-added organic products. • Compare raw and processed produce value. • Prepare produce processing and packaging records. • Compile simple product evaluation report.	Guide students to: • Evaluate value-added organic products. • Compare raw and processed produce value. • Prepare produce processing and packaging records. • Compile simple product evaluation report.	Record sheets, notebooks, processed produce, smartphones, PPE, practical manual, etc.
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%						

URBAN ORGANIC FARMING AND CONTROLLED ENVIRONMENT AGRICULTURE

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: URBAN ORGANIC FARMING AND CONTROLLED ENVIRONMENT AGRICULTURE	COURSE CODE: OCP 423	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in urban organic farming and controlled environment agriculture for sustainable crop production in limited spaces.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the principles and systems of urban and peri-urban organic farming; 2.0 Know urban and peri-urban farm establishment and controlled environment practices; 3.0 Know container-based and protected organic crop production practices; 4.0 Know irrigation, crop maintenance and environmental management practices; 5.0 Know urban and peri-urban waste utilization and sustainable production practices; 6.0 Understand productivity assessment, farm evaluation and record keeping practices.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: URBAN ORGANIC FARMING AND CONTROLLED ENVIRONMENT AGRICULTURE			COURSE CODE: OCP 423		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in urban organic farming and controlled environment agriculture for sustainable crop production in limited spaces.						
GENERAL OBJECTIVE 1.0: Understand principles and systems of urban and peri-urban organic farming						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2	1.1 Explain principles of urban and peri-urban organic farming. 1.2 Discuss urban and peri-urban farming models and approaches 1.3 Discuss urban farming systems challenges and opportunities 1.4 Explain advantages and disadvantages of urban and peri-urban farming. 1.5 Explain importance of controlled environment agriculture. 1.6 Describe urban and peri-urban space utilization for crop production.	• Discuss urban and peri-urban farming systems using practical examples. • Describe urban and peri-urban farming models and approaches. • Discuss opportunities and constraints in urban and peri-urban agriculture.	Textbooks, journals, internet, charts, white/smart boards, markers, projector, videos, etc.	• Identify suitable spaces for urban and peri-urban organic farming. • Identify different urban and peri-urban farming systems. • Conduct simple urban and peri-urban farm site assessment. • Prepare urban and peri-urban farming observation records.	Guide students to: • Identify suitable spaces for urban and peri-urban organic farming. • Identify different urban and peri-urban farming systems. • Conduct simple urban and peri-urban farm site assessment. • Prepare urban and peri-urban farming observation records.	Urban and peri-urban farm models, notebooks, observation sheets, measuring tools, smartphones, PPE, practical manual, etc.

General Objective 2.0: Know urban and peri-urban farm establishment and controlled environment practices						
3-5	2.1 Explain container farming practices. 2.2 Explain urban and peri-urban farm establishment requirements in organic system. 2.3 Describe controlled environment systems for crop production in organic system (green/screen house). 2.4 Explain space-efficient farming practices. 2.5 Describe environmental requirements for urban and peri-urban organic farming system. 2.6 Explain urban and peri-urban farming setup requirements including bio-security methods.	• Discuss container and protected farming using practical examples. • Discuss urban and peri-urban farm establishment using practical examples. • Describe controlled environment setup procedures. • Discuss space-efficient production practices. • Discuss environmental requirements for urban and peri-urban organic farming system. • Describe urban and peri-urban farming setup requirements including biosecurity methods (e.g. spraying method, heating	Textbooks, journals, charts, projector, smart/white board, internet, videos, marker, etc.	• Prepare nursery units for urban and peri-urban crop production. • Carry out sack farming, container gardening, balcony, roof top, etc. • Establish group/individual vertical farming units. • Prepare urban and peri-urban farm establishment records.	Guide students to: • Prepare nursery units for urban and peri-urban crop production. • Carry out sack farming, container gardening, balcony, roof top, etc. • Establish group/individual vertical farming units. • Prepare urban and peri-urban farm establishment records.	Containers, sacks, nursery trays, growing media, seed, seed trays, irrigation set, wheel barrow, smartphones, PPE, farm tools, soil from organic/unpolluted land, practical manual, CCTV, light sources, etc.

		methods, foot bath, etc)				
General Objective 3.0: Know container-based and protected organic crop production practices						
6-8	3.1 Explain protected crop production in urban and peri-urban environments (green/screen house). 3.2 Explain crop establishment requirements for organic hydroponics system. 3.3 Describe protected cultivation methods for urban and peri-urban farming.	• Discuss urban crop establishment methods. • Discuss protected cultivation practices. • Explain protected cultivation methods for urban and peri-urban farming.	Textbooks, journals, charts, projector, internet, videos, etc.	• Conduct seed sowing and transplanting in urban systems. • Carry out spacing and arrangement of container crops. • Carry out basic hydroponic or controlled environment demonstration where available. • Prepare crop establishment records.	Guide students to: • Conduct seed sowing and transplanting in urban systems. • Carry out spacing and arrangement of container crops. • Carry out basic hydroponic or controlled environment demonstration where available. • Prepare crop establishment records.	Containers, Seed, seedlings, nursery trays, hydroponic materials, PPE, greenhouse facilities, practical manual, etc.
General Objective 4.0: Know irrigation, crop maintenance and environmental management practices						
9-11	4.1 Explain irrigation practices in urban and peri-urban farming. 4.2 Describe crop maintenance in controlled systems. 4.3 Explain environmental	• Discuss irrigation and maintenance using practical examples. • Discuss crop maintenance and	Textbooks, journals, charts, projector, internet, white/smart	• Carry out irrigation and watering activities in urban and peri-urban systems. • Conduct crop maintenance and	Guide students to: • Carry out irrigation and watering activities in urban and peri-urban systems.	Watering cans, irrigation kits, crop containers, environmental

	management in urban and peri-urban crop production. 4.4 Describe irrigation and maintenance systems for urban and peri-urban farming.	environmental monitoring procedures. • Discuss irrigation requirements in controlled systems.	board, videos etc.	sanitation practices. • Monitor environmental conditions affecting crop growth. • Carry out pruning and crop support activities. • Prepare irrigation and crop maintenance records.	• Conduct crop maintenance and sanitation practices. • Monitor environmental conditions affecting crop growth. • Carry out pruning and crop support activities. • Prepare irrigation and crop maintenance records.	monitoring tools, PPE, practical manual, etc.
General Objective 5.0: Know urban and peri-urban waste utilization and sustainable production practices						
12-13	5.1 Explain urban and peri-urban waste utilization in crop production. 5.2 Explain composting and organic waste recycling practices. 5.3 Describe sustainable urban and peri-urban production systems.	• Discuss waste recycling and sustainability using practical examples. • Describe composting methods. • Discuss sustainable production practices.	Textbooks, journals, charts, projector, white/smart board, marker, internet, videos, etc.	• Identify waste materials available locally. • Practice waste sorting for composting. • Carry out compost preparation using locally available waste materials. • Apply compost materials to crops. • Conduct simple sustainability assessment exercise.	Guide students to: • Identify waste materials available locally. • Practice waste sorting for composting. • Carry out compost preparation using locally available waste materials. • Apply compost materials to crops.	Compost materials, waste bins, containers, compost tools, compost thermometer, PPE, smartphones, practical manual, etc.

				• Keep composting and waste utilization records.	• Conduct simple sustainability assessment exercise. • Keep composting and waste utilization records.	
General Objective 6.0: Understand productivity assessment, farm evaluation and record keeping practices						
14-15	6.1 Explain productivity assessment in urban and peri-urban farming. 6.2 State urban farm evaluation requirements. 6.3 Explain importance of farm records in urban and peri-urban farming	• Discuss productivity assessment using practical examples. • Describe urban farm evaluation procedures. • Discuss importance of farm records in urban and peri-urban farming	Textbooks, journals, charts, projector, white/smart board, marker, internet, etc.	• Conduct crop productivity assessment in urban systems. • Compare productivity of selected urban farming methods. • Prepare urban farm records and documentation. • Prepare simple urban farm evaluation report.	Guide students to: • Conduct crop productivity assessment in urban systems. • Compare productivity of selected urban farming methods. • Prepare urban farm records and documentation. • Prepare simple urban farm evaluation report.	Record sheets, notebooks, urban crop records, PPE, smartphones, practical manual, etc.
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%						

FARM WASTE RECYCLING AND CIRCULAR BIOECONOMY SYSTEMS

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: FARM WASTE RECYCLING AND CIRCULAR BIOECONOMY SYSTEMS	COURSE CODE: OCP 424	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in farm waste recycling, nutrient recovery and circular bioeconomy systems for sustainable organic crop production.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand the principles of farm waste recycling and circular bioeconomy systems; 2.0 Know farm waste identification, segregation and management practices; 3.0 Understand composting, vermicomposting and organic nutrient recycling practices; 4.0 Know biofertilizer production and waste-to-resource conversion practices; 5.0 Understand circular nutrient management and sustainability practices; 6.0 Know waste recycling evaluation, documentation and reporting practices.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: FARM WASTE RECYCLING AND CIRCULAR BIOECONOMY SYSTEMS			COURSE CODE: OCP 424		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and practical skills in farm waste recycling, nutrient recovery and circular bioeconomy systems for sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Understand the principles of farm waste recycling and circular bioeconomy systems.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1–2	1.1 Explain principles of farm waste recycling. 1.2 Discuss circular bioeconomy systems in agriculture. 1.3 Explain the importance of waste recycling in organic farming. 1.4 Describe the benefits of nutrient recycling in crop production. 1.5 Explain sustainable resource use in agriculture.	• Explain principles of farm waste recycling. • Explain circular bioeconomy systems in agriculture. • Explain the importance of waste recycling in organic farming. • Explain the	Textbooks, journals, smart/white boards, internet, charts, projector, videos, etc.	• Identify recyclable organic farm wastes. • Identify reusable and non-reusable organic residues. • Conduct farm waste observation exercise. • Prepare simple waste inventory records.	Guide students to: • Identify recyclable organic farm wastes. • Identify reusable and non-reusable organic residues. • Conduct farm waste observation exercise. • Prepare simple waste inventory records.	Organic waste samples, observation sheets, notebooks, PPE, computers, smartphones, practical manual, etc.

		benefits of nutrient recycling in crop production. • Explain sustainable resource use in agriculture.				
General Objective 2.0: Know farm waste identification, segregation and management practices.						
3–5	1.6 Explain farm waste management practices. 1.7 Discuss waste segregation and handling requirements. 1.8 Explain safe waste handling practices. 1.9 Describe waste utilization options in crop production. 1.10 Explain waste management planning practices.	• Explain farm waste management practices. • Explain waste segregation and handling requirements. • Explain safe waste handling practices. • Explain waste utilization options in crop production.	Textbooks, journals, charts, smart/white boards, projector, internet, videos, etc.	• Conduct farm waste segregation exercise. • Carry out sorting of residues for recycling. • Carry out safe waste handling and storage activities. • Prepare waste management plan for selected farms. • Prepare farm waste management records.	Guide students to: • Conduct farm waste segregation exercise. • Carry out sorting of residues for recycling. • Carry out safe waste handling and storage activities. • Prepare waste management plan for selected farms. • Prepare farm waste management records.	Waste bins, gloves, organic residues, farm tools, smartphones, PPE, practical manual, etc.

		• Explain waste management planning practices.				
General Objective 3.0: Understand composting, vermicomposting and organic nutrient recycling practices.						
6–8	3.1 Explain composting principles and methods. 3.2 Discuss vermicomposting practices in crop production. 3.3 Explain nutrient recycling requirements in organic agriculture. 3.4 Describe compost maturity and quality assessment.	• Explain composting principles and methods. • Explain vermicomposting practices in crop production. • Explain nutrient recycling requirements in organic agriculture. • Describe compost maturity and quality	Textbooks, journals, charts, smart/white boards, projector, internet, videos, etc.	• Establish compost piles using farm residues. • Carry out vermicompost preparation where available. • Carry out compost turning and moisture management. • Conduct assessment of compost maturity and quality. • Apply compost on crop plots. • Prepare composting activities records.	Guide students to: • Establish compost piles using farm residues. • Carry out vermicompost preparation where available. • Carry out compost turning and moisture management. • Conduct assessment of compost maturity and quality. • Apply compost on crop plots. • Prepare composting activities records.	Compost materials, worms, watering cans, farm tools, thermometer, compost dibber, smartphones, PPE, practical manual, etc.

		assessment.				
General Objective 4.0: Know biofertilizer production and waste-to-resource conversion practices.						
9–11	4.1 Explain biofertilizer production practices 4.2 Discuss waste-to-resource conversion systems. 4.3 Explain organic nutrient recovery methods. 4.4 Describe farm waste utilization for crop production. 4.5 Discuss the concept of rain water husbandry/harvesting 4.6 Explain the importance of rain water husbandry in organic crop production 4.7 Discuss the methods of rain water husbandry in organic crop production	• Explain biofertilizer production using practical examples. • Describe different waste conversion methods. • Discuss nutrient recovery systems. • Discuss the concept of rain water husbandry • Explain the importance of rain water husbandry in organic crop production (e.g. construction of reservoir, channeling of run off to pits,	Textbooks, journals, charts, smart/white boards, projector, internet, videos, etc.	• Prepare simple liquid organic fertilizer or biofertilizer. • Convert selected organic waste materials into farm inputs. • Conduct nutrient recycling exercise on field plots. • Conduct different waste conversion methods using residues • Carry out any simple rain water husbandry practice • Prepare biofertilizer production records.	Guide students to: • Prepare simple liquid organic fertilizer or biofertilizer. • Convert selected organic waste materials into farm inputs. • Conduct nutrient recycling exercise on field plots. • Conduct different waste conversion methods using residues • Carry out any simple rain water husbandry practice • Prepare biofertilizer production records.	Organic waste materials, drums, smartphones, PPE, containers, crop plots, practical manual, etc.

		tanks in parallel setting etc) • Describe the methods of rain water husbandry in organic crop production				
General Objective 5.0: Understand circular nutrient management and sustainability practices.						
12– 13	5.1 Explain nutrient cycling in organic agriculture. 5.2 Discuss sustainability practices in farm waste recycling. 5.3 Explain circular nutrient production systems. 5.4 Describe farm sustainability assessment practices.	• Explain nutrient cycling using practical examples. • Describe circular nutrient production systems. • Discuss sustainability practices in organic farming. • Describe farm sustainability assessment practices.	Textbooks, journals, charts, smart/white boards, projector, internet, videos, etc.	• Conduct nutrient recycling assessment exercise. • Practice farm sustainability evaluation. • Prepare simple circular farm nutrient plan. • Assess efficiency of farm waste reuse systems. • Prepare sustainability assessment records.	Guide students to: • Conduct nutrient recycling assessment exercise. • Practice farm sustainability evaluation. • Prepare simple circular farm nutrient plan. • Assess efficiency of farm waste reuse systems. • Prepare sustainability assessment records.	Sustainability checklist, notebooks, nutrient plans, smartphones, PPE, practical manual, etc.

General Objective 6.0: Know waste recycling evaluation, documentation and reporting practices.

14– 15	5.4 Explain waste recycling evaluation practices. 5.5 Discuss documentation requirements in recycling systems. 5.6 Explain importance of recycling records.	• Explain waste recycling evaluation using practical examples. • Discuss reporting and documentation procedures. • Explain importance of recycling records	Textbooks, journals, charts, smart/white boards, projector, internet, etc.	• Evaluate farm recycling activities and outcomes. • Prepare waste recycling and nutrient recovery records. • Prepare recycling performance report. • Present findings on farm waste utilization systems.	Guide students to: • Evaluate farm recycling activities and outcomes. • Prepare waste recycling and nutrient recovery records. • Prepare recycling performance report. • Present findings on farm waste utilization systems.	Record sheets, notebooks, farm recycling records, smartphones, PPE, water dibber, rain guage, practical manual, etc.
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COURSE ASSESSMENT:**Course Work:** 10%**Test/Assignments:** 10%**Practical:** 40%**Examination:** 40%**Total:** 100%

POST-HARVEST HANDLING AND STORAGE IN ORGANIC SYSTEMS

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: POST-HARVEST HANDLING AND STORAGE IN ORGANIC SYSTEMS	COURSE CODE: OCP 425	CONTACT HOURS: 4 HOURS/WEEK
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in post-harvest handling, produce preservation and storage systems for organic crop products.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the principles of post-harvest handling and produce preservation in organic system; 2.0 Know harvesting, sorting and grading practices for organic produce; 3.0 Know post-harvest handling and transportation practices in organic system; 4.0 Know storage systems and environmental management practices in organic system; 5.0 Understand post-harvest quality monitoring and loss reduction practices in organic system; 6.0 Understand post-harvest evaluation, documentation and reporting practices.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: POST-HARVEST HANDLING AND STORAGE IN ORGANIC SYSTEMS			COURSE CODE: OCP 425		CONTACT HOURS: 4 HOURS/WEEK	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in post-harvest handling, produce preservation and storage systems for organic crop products.						
GENERAL OBJECTIVE 1.0: Understand the principles of post-harvest handling and produce preservation in organic system.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Explain principles of post-harvest handling. 1.2 Discuss causes of post-harvest losses in crop production. 1.3 Explain importance of produce preservation. 1.4 Describe post-harvest quality maintenance practices. 1.5 Explain post-harvest requirements for organic produce.	• Discuss post-harvest handling using practical examples. • Discuss produce preservation and quality maintenance. • Describe post-harvest handling requirements. •Discuss post-harvest quality	Textbooks, journals, internet, white/smart boards, markers, charts, projector, videos, etc.	• Identify harvest maturity indicators for selected crops. • Identify produce affected by post-harvest losses • Conduct produce inspection exercise. • Prepare post-harvest observation records.	Guide students to: • Identify harvest maturity indicators for selected crops. • Identify causes of post-harvest losses • Conduct produce inspection exercise. • Keep post-harvest observation records.	Organic produce samples, harvest charts, notebooks, smartphones, PPE, practical manual, etc.

		maintenance practices. • Describe post-harvest requirements for organic produce.				
General Objective 2.0: Know harvesting, sorting and grading practices for organic produce						
3-5	2.1 Explain harvesting practices for organic produce. 2.2 Explain produce handling during harvesting. 2.3 Describe quality standards for harvested produce. 2.4 Explain harvesting tools and methods. 2.5 Discuss sorting and grading requirements.	• Describe harvesting practices and procedures for organic produce. • Discuss harvesting tools and methods. • Describe produce handling during harvesting • Discuss sorting and grading procedures.	Textbooks, journals, charts, smart/white boards, markers, projector, internet, videos etc.	• Conduct harvesting of selected crops. • Practice sorting and grading of harvested produce. • Identify damaged and acceptable produce. • Carry out produce cleaning after harvest. • Prepare harvesting and grading records.	Guide students to: • Conduct harvesting of selected crops. • Practice sorting and grading of harvested produce. • Identify damaged and acceptable produce. • Carry out produce cleaning after harvest. • Keep harvesting and grading records.	Harvesting tools, organic produce, grading trays, cleaning materials, smartphones, PPE, practical manual etc.

		• Discuss quality standards for harvested produce. Explain sorting and grading requirements.				
General Objective 3.0: Know post-harvest handling and transportation practices in organic system.						
6-8	3.1 Explain post-harvest handling procedures. 3.2 Explain packaging and handling practices during transportation. 3.3 Discuss produce transportation requirements. 3.4 Describe post-harvest damage prevention measures.	• Discuss post-harvest handling using practical examples. • Discuss produce handling and transportation methods to local and distant markets. • Discuss damage prevention practices.	Textbooks, journals, charts, projector, smart/white boards, markers, internet, videos, etc.	• Practice packaging of harvested produce for transport. • Conduct produce handling and loading exercise. • Identify suitable transportation methods for selected produce. • Assess post-harvest damage after transportation simulation. • Keep transportation and handling records.	Guide student to : • Practice packaging of harvested produce for transport. • Conduct produce handling and loading exercise. • Identify suitable transportation methods for selected produce. • Assess post-harvest damage after transportation simulation. • Keep transportation and	Packaging materials, transport containers, crop produce, smartphones, PPE, practical manual, etc.

					handling records.	
General Objective 4.0: Know storage systems and environmental management practices in organic system.						
9-11	4.1 Explain storage systems for organic produce. 4.2 Discuss environmental requirements for storage. 4.3 Explain temperature, relative humidity and moisture management in storage systems. 4.4 Describe storage structures for crop produce. 4.5 Highlights storage requirements for produce preservation in organic system.	• Discuss storage systems using practical examples. • Describe environmental management practices in storage. • Discuss storage structures for crop produce. Explain storage requirements for produce preservation.	Textbooks, journals, charts, projector, smart/white boards, internet, videos, etc.	• Prepare simple produce storage facility. • Practice produce arrangement for storage. • Monitor temperature and moisture conditions in storage. • Compare storage methods for selected produce. • Prepare storage management records.	Guide students to: • Prepare simple produce storage facility. • Practice produce arrangement for storage. • Monitor temperature and moisture conditions in storage. • Compare storage methods for selected produce. • Keep storage management records.	Storage facilities, thermometers, moisture meters, hygrometers, produce containers, smartphones, PPE, practical manual, etc.
General Objective 5.0: Understand post-harvest quality monitoring and loss reduction practices in organic system.						
12-13	5.1 Explain post-harvest quality monitoring practices. 5.2 Discuss methods of reducing post-harvest losses. 5.3 Explain spoilage prevention	• Discuss post-harvest quality monitoring using practical examples.	Textbooks, journals, charts, projector, smart/white	• Conduct quality monitoring of stored produce. • Identify spoilage indicators during storage.	Guide students to: • Conduct quality monitoring of stored produce. • Identify spoilage	Quality checklist, stored produce, notebooks,

	measures. 5.4 Describe shelf-life management practices.	• Describe spoilage prevention procedures. • Discuss loss reduction strategies. • Discuss shelf-life management practices.	boards, internet, videos, etc.	• Assess post-harvest losses in selected produce. • Practice shelf-life observation and monitoring. • Prepare quality monitoring records.	indicators during storage. • Assess post-harvest losses in selected produce. • Practice shelf-life observation and monitoring. • Keep quality monitoring records.	smartphones, PPE, practical manual, etc.
General Objective 6.0: Understand post-harvest evaluation, documentation and reporting practices						
14-15	6.1 Explain post-harvest evaluation practices. 6.2 Discuss documentation requirements for post-harvest management. 6.3 Explain importance of produce handling records.	• Discuss post-harvest evaluation using practical examples. • Describe reporting and documentation procedures. Discuss importance of produce handling records.	Textbooks, journals, charts, white/smart boards, markers, projector, internet, etc.	• Evaluate post-harvest handling and storage activities. • Prepare post-harvest handling and storage records. • Compile produce quality and loss assessment report. • Present findings on produce preservation outcomes.	Guide students to: • Evaluate post-harvest handling and storage activities. • Prepare post-harvest handling and storage records. • Compile produce quality and loss assessment report. • Present findings on produce preservation outcomes.	Record sheets, notebooks, storage records, smartphones, PPE, practical manual, etc.

COURSE ASSESSMENT:

Course Work – 10%

Test/Assignments – 10%

Practical – 40%

Examination – 40%

Total = 100%



ORGANIC STANDARDS, CERTIFICATION AND TRACEABILITY

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: ORGANIC STANDARDS, CERTIFICATION AND TRACEABILITY	COURSE CODE: OCP 426	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in organic standards compliance, certification, inspection and traceability systems for sustainable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Know organic standards and compliance practices; 2.0 Understand the principles and requirements of organic certification systems; 3.0 Know farm inspection and certification procedures in organic system; 4.0 Know traceability and documentation systems in organic crop production; 5.0 Know quality assurance and record management practices in organic system; 6.0 Understand the Standards for processing aid, additives and inputs production in organic system.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: ORGANIC STANDARDS, CERTIFICATION AND TRACEABILITY		COURSE CODE: OCP 426			CONTACT HOURS: 3 HOURS/WEEK	
		CREDIT UNIT: 3			THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II		PRE-REQUISITE:			PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in organic standards compliance, certification, inspection and traceability systems for sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Know organic standards and compliance practices						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-3	1.1 Define major terms used in organic standards and certification 1.2 Explain organic production standards. 1.3 Discuss approved and prohibited materials in organic farming. 1.4 Explain compliance requirements in organic crop production (including hydroponics, mushroom and green/screen house production) 1.5 Explain the Organic System plan required for certification. 1.6 Explain the consequences of	• Discuss major terms used in organic standards and certification; buffer zone, conversion period, in-conversion, etc • Discuss organic production standards • Explain approved and prohibited practices in organic farming.	Textbooks, journals, organic standards (NOAN, IFOAM, etc), smart/white boards, manuals, projector, charts, pictures, internet, etc.	• Identify approved and prohibited farm inputs. • Conduct farm compliance inspection exercise. • Practice use of compliance checklist. • Conduct assessment on farm practices in conformity with organic standards. • Prepare organic system plan • Prepare compliance	Guide students to: • Identify approved and prohibited farm inputs. • Conduct farm compliance inspection exercise. • Practice use of compliance checklist. • Conduct assessment on farm practices in conformity with	Organic standards manuals, compliance checklist, smartphones, organic products, field assessment sheet, field plots, farm records, PPE, practical

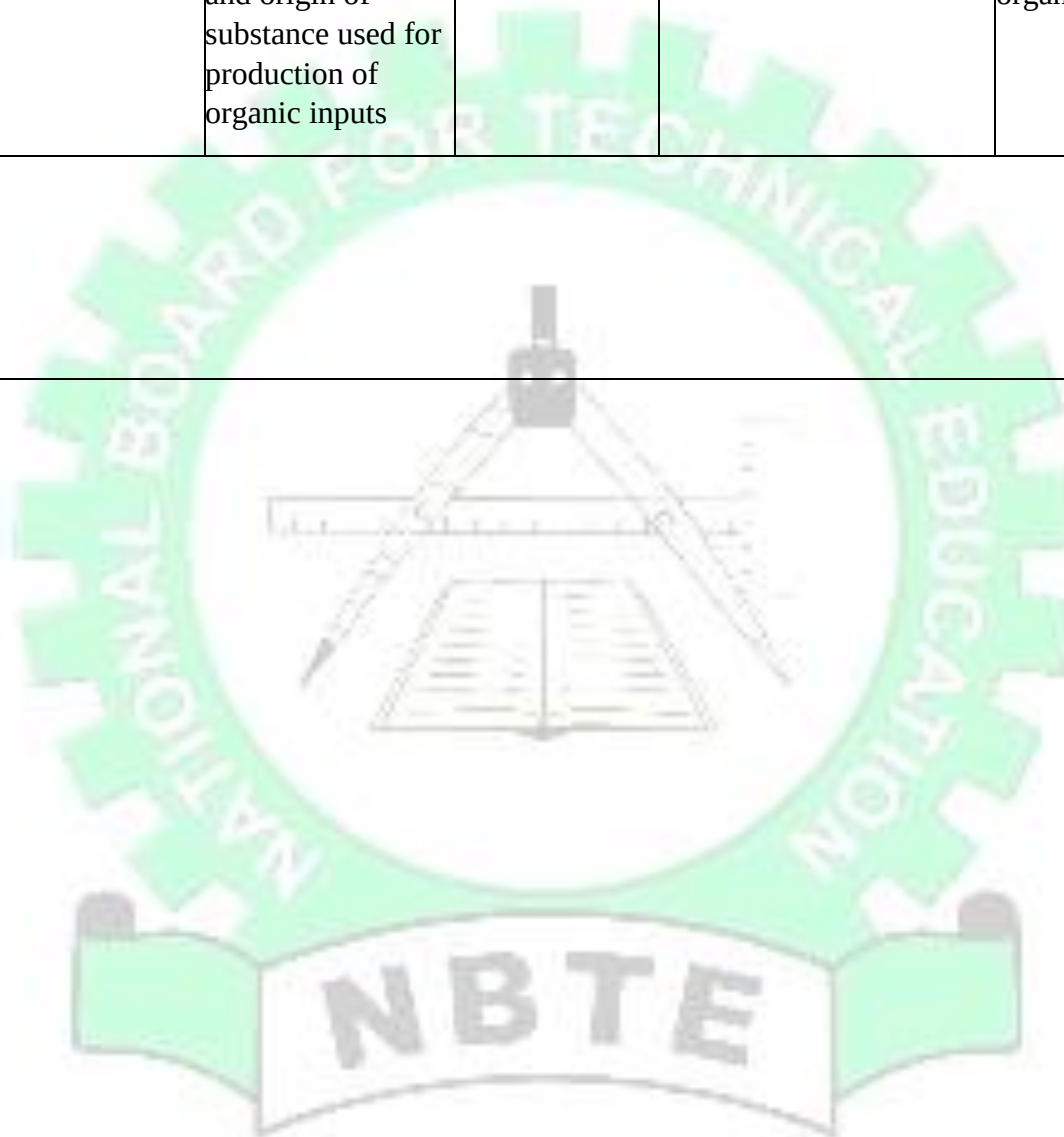
	non-compliance.	• Discuss the compliance requirements and assessment methods. • Discuss the Organic System plan required for certification.		records. • Prepare simple compliance report.	organic standards. • Prepare organic system plan • Maintain compliance records. • Prepare simple compliance report.	manual etc.
General Objective 2.0: Understand the principles and requirements of organic certification systems						
4-6	2.1 Explain organic certification concepts using practical examples 2.2 Explain types of certification in organic crop production. 2.3 Discuss importance of certification in organic farming. 2.4 Explain certification requirements for organic farms. 2.5 Explain role of certification bodies and inspection systems. 2.6 List some organizations involved with organic certification	• Discuss organic certification concepts using practical examples. • Discuss the types of certification in organic crop production. • Explain the importance of certification in organic farming • Describe role of certification bodies and inspection systems.	Textbooks, journals, internet, certification manuals, white/smart boards, projector, videos, charts, etc.	• Identify certification documents and forms. • Examine sample organic certification records. • Practice filling simple certification forms. • Conduct mock farm certification readiness check. • Prepare certification observation records.	Guide students to: • Identify certification documents and forms. • Examine sample organic certification records. • Practice filling simple certification forms. • Conduct mock farm certification readiness check. • Prepare certification observation records.	Certification forms, inspection sheets, smartphones, sample farm records, notebooks, PPE, practical manual, etc.

		• Discuss certification requirements and principles.				
General Objective 3.0: Know farm inspection and certification procedures in organic system						
7-9	3.1 Explain farm inspection procedures for organic certification. 3.2 Discuss certification process and stages. 3.3 Explain inspection requirements and documentation. 3.4 Describe farm audit procedures. 3.5 Explain corrective actions for certification compliance.	• Discuss inspection and certification procedures using practical examples. - Explain certification process and stages. • Describe farm audit and inspection methods. • Discuss corrective actions and compliance improvement.	Textbooks, journals, certification manuals, white/smart boards, projector, videos, charts, etc.	• Conduct mock farm inspection exercise. • Carry out farm audit using inspection checklist. • Practice completion of inspection forms. • Identify certification gaps on selected farm plots. • Prepare corrective action plan for farm compliance. • Prepare inspection records.	Guide students to: • Conduct mock farm inspection exercise. • Carry out farm audit using inspection checklist. • Practice completion of inspection forms. • Identify certification gaps on selected farm plots. • Prepare corrective action plan for farm compliance. • Keep inspection records.	Inspection forms, audit checklist, field plots, smartphones, notebooks, PPE, practical manual, etc.
General Objective 4.0: Know traceability and documentation systems in organic crop production						
10-11	4.1 Explain traceability systems in organic farming. 4.2 State farm documentation	• Discuss traceability systems using	Textbooks, journals, traceability	• Carry out labelling and coding of organic produce.	Guide students to: • Carry out labelling	Labelled organic materials,

	requirements. 4.3 Explain product tracking and identification systems. 4.4 Describe the traceability procedures in organic production. 4.5 Explain label and its concept in organic production system	practical examples. • Discuss farm documentation and product tracking methods. • Discuss the importance of traceability in organic production. • Describe the different labels in organic production system	manuals, white/smart boards, marker, charts, projector, internet, etc.	• Carry out farm input-output tracking exercise. • Prepare simple traceability records. • Conduct product movement documentation exercise. • Identify products with organic label • Prepare documentation of cultivation records. • Prepare traceability processes records.	and coding of organic produce. • Carry out farm input-output tracking exercise. • Prepare simple traceability records. • Conduct product movement documentation exercise. • Identify products with organic label • Prepare documentation of cultivation records. • Keep traceability records.	coding materials, record sheets, sample produce, smartphones, notebooks, PPE, practical manual, etc.
General Objective 5.0: Know quality assurance and record management practices in organic system						
12-13	5.1 Explain quality assurance practices in organic crop production. 5.2 Explain farm documentation and record management. 5.3 Explain quality maintenance requirements. 5.4 Describe importance of	• Discuss quality assurance practices using practical examples. • Discuss farm documentation and record	Textbooks, journals, charts, white/smart boards, marker, projector, internet,	• Carry out quality assessment of farm operations. • Prepare farm production records. • Carry out quality assurance checklist exercise.	Guide students to: • Carry out quality assessment of farm operations. • Prepare farm production records. • Carry out quality	Farm records, quality checklist, smartphones, PPE, filing materials, notebooks,

	accurate records. 5.5 Explain corrective documentation procedures.	management. • Discuss quality maintenance requirements. Discuss corrective documentation procedures.	videos, etc.	• Carry out organization and filing of certification documents. • Prepare corrective compliance action plan • Prepare quality assurance records.	assurance checklist exercise. • Carry out organization and filing of certification documents. • Prepare corrective compliance action plan • Keep quality assurance records.	practical manual, penetrometer, seed tester machine, etc.
General Objective 6.0: Understand the Standards for processing aid, additives and inputs production in organic system						
14-15	6.1 Explain processing aid and food additives in organic production system 6.2 List the allowable processing aid, food additives and their limitations in organic production system 6.3 Discuss the nature and origin of substance used for production of organic inputs (e.g. fertilizers, soil conditioners, crop protectants, growth regulators, etc)	• Discuss processing aid and food additives in organic production system • Explain the allowable processing aid, food additives and their limitations in organic production system (e.g, wood ash, tannin, calcium carbonate, etc) Explain the nature	Textbooks, journals, organic standards, charts, white/smart boards, marker, projector, pictures. audiovisual materials, internet, etc.	• Visit organic product processing plants • Identify processing aid and food additives • Collect organic input production materials locally available • Carry out production of organic input	Guide students to: • Visit organic product processing plants • Identify processing aid and food additives • Collect organic input production materials locally available • Carry out production of	Organic standard manual, organic produce processing plant, notebooks, smartphones, organic input materials, , PPE, practical manual, etc.

		and origin of substance used for production of organic inputs			organic input	
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%						



REGENERATIVE AGRICULTURE AND BIODIVERSITY CONSERVATION

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY		
COURSE TITLE: REGENERATIVE AGRICULTURE AND BIODIVERSITY CONSERVATION	COURSE CODE: OCP 427	CONTACT HOURS: 3 HOURS/WEEK
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and practical skills in regenerative agriculture, biodiversity conservation and ecological management for sustainable organic crop production.		
GENERAL OBJECTIVES On completion of this course, the students should be able to: 1.0 Understand the principles of regenerative agriculture and biodiversity conservation; 2.0 Know biodiversity assessment and ecosystem management practices; 3.0 Know soil regeneration and ecological restoration practices; 4.0 Know crop diversification and regenerative production practice; 5.0 Understand habitat conservation management and ecological protection practices; 6.0 Understand biodiversity monitoring, farm evaluation and record keeping practices.		

PROGRAMME: HIGHER NATIONAL DIPLOMA IN ORGANIC CROP PRODUCTION TECHNOLOGY						
COURSE TITLE: REGENERATIVE AGRICULTURE AND BIODIVERSITY CONSERVATION			COURSE CODE: OCP 427		CONTACT HOURS: 3 HOURS/WEEK	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to: equip students with knowledge and practical skills in regenerative agriculture, biodiversity conservation and ecological management for sustainable organic crop production.						
GENERAL OBJECTIVE 1.0: Understand the principles of regenerative agriculture and biodiversity conservation						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher’s Activities	Resources	Specific Learning Outcome	Teacher’s Activities	Resources
1-2	1.1 Explain principles of regenerative agriculture. 1.2 Discuss biodiversity conservation in crop production. 1.3 Explain ecological balance in farming systems. 1.4 Describe importance of biodiversity in organic farming. 1.5 Explain benefits of regenerative farming systems.	• Discuss regenerative agriculture using practical examples. • Explain biodiversity conservation and ecosystem balance. • Describe ecological balance in farming systems. • Discuss importance of biodiversity and benefits of regenerative farming systems in organic	Textbooks, journals, internet, charts, smart/white boards, projector, videos, etc.	• Identify plots for regenerative agriculture • Carry out regenerative agriculture practice • Identify biodiversity components on crop farms. • Conduct farm biodiversity observation exercise. • Carry out simple ecological assessment of crop farms. • Prepare biodiversity observation records.	Guide students to: • Identify plots for regenerative agriculture • Carry out regenerative agriculture practice • Identify biodiversity components on crop farms. • Conduct farm biodiversity observation exercise. • Carry out simple ecological	Field plots, crop farms, hand lens, observation sheets, notebooks, smartphones, PPE, practical manual, etc.

		farming.			assessment of crop farms	
General Objective 2.0: Know biodiversity assessment and ecosystem management practices						
3-5	2.1 Explain biodiversity assessment practices. 2.2 Discuss ecosystem management in crop production. 2.3 Explain ecological indicators in farming. 2.4 Describe biodiversity conservation measures. 2.5 Explain ecosystem restoration practices.	• Discuss biodiversity assessment using field examples. • Describe ecosystem observation and conservation practices. • Discuss ecological indicators and restoration methods.	Textbooks, journals, charts, projector, white/smart boards, internet, videos, etc.	• Conduct biodiversity mapping on crop fields. • Identify beneficial insects and organisms. • Carry out ecosystem observation and biodiversity inventory. • Carry out simple biodiversity scoring exercises. • Assess ecological indicators on field plots. • Prepare biodiversity assessment records.	Guide students to: • Conduct biodiversity mapping on crop fields. • Identify beneficial insects and organisms. • Carry out ecosystem observation and biodiversity inventory. • Carry out simple biodiversity scoring exercises. • Assess ecological indicators on field plots. • Prepare biodiversity assessment records.	Observation sheets, field plots, insect nets, animal traps, smartphones, PPE, notebooks, practical manual, etc.

General Objective 3.0: Know soil regeneration and ecological restoration practices						
6-8	3.1 Explain soil regeneration. 3.2 Explain the importance of soil regeneration 3.3 Explain the role of organic matter in soil regeneration 3.4 Explain ecological soil management practices 3.5 Discuss ecological soil restoration methods. 3.6 Describe conservation practices for soil health improvement.	• Discuss soil regeneration and its importance • Explain the role of organic matter in soil regeneration - Discuss ecological soil management practices • Describe soil restoration methods. • Discuss conservation practices for soil health improvement	Textbooks, journals, charts, projector, smart/white boards, internet, videos, etc.	• Carry out ecological soil management practices. • Perform ecological soil restoration methods. • Establish green manure and cover crop plots. • Conduct simple soil condition assessment. • Carry out erosion prevention practices. • Prepare soil regeneration records.	Guide students to: • Carry out ecological soil management practices. • Perform ecological soil restoration methods. • Establish green manure and cover crop plots. • Conduct simple soil condition assessment. • Carry out erosion prevention practices. • Prepare soil regeneration records.	Compost, mulch materials, cover crop seeds, field plots, farm tools, smartphones, PPE, practical manual, etc.
General Objective 4.0: Understand crop diversification and regenerative production practices						
9-11	4.1 Explain crop diversification practices. 4.2 Discuss intercropping and mixed cropping systems. 4.3 Explain regenerative production practices. 4.4 Describe role of diversity in sustainable crop	• Discuss crop diversification practices using field examples. • Discuss regenerative crop production systems. • Discuss mixed	Textbooks, journals, charts, white/smart boards, projector, internet,	• Establish intercropping and mixed cropping plots. • Carry out crop diversification techniques on field plots. • Carry out regenerative crop establishment	Guide students to: • Establish intercropping and mixed cropping plots. • Carry out crop diversification	Seeds, field plots, farm tools, ropes, pegs, smartphones, PPE, practical

	production.	cropping and intercropping practices. • Explain role of diversity in sustainable crop productivity.	videos, etc.	practices. • Compare crop performance under mixed cropping and monoculture. • Prepare regenerative production records.	techniques on field plots. • Carry out regenerative crop establishment practices. • Compare crop performance under mixed cropping and monoculture. • Prepare regenerative production records.	manual, etc.
General Objective 5.0: Understand habitat conservation management and ecological protection practices						
12-13	5.1 Explain habitat conservation management practices. 5.2 Discuss ecological protection measures on farms. 5.3 Explain pollinator conservation practices. 5.4 Describe habitat improvement practices.	• Discuss habitat conservation management using practical examples. • Discuss ecological conservation measures. • Describe pollinator protection and habitat management. • Explain habitat improvement practices.	Textbooks, journals, charts, projector, white/smart boards, internet, videos, etc.	• Establish simple pollinator-friendly habitat areas. • Carry out habitat improvement activities on crop farms. • Carry out ecological protection and conservation activities. • Conduct biodiversity protection measures. • Prepare conservation activity records.	Guide students to: • Establish simple pollinator-friendly habitat areas. • Carry out habitat improvement activities on crop farms. • Carry out ecological protection and conservation activities. • Conduct biodiversity protection measures.	Pollinator plants, field plots, farm tools, sanitation tools, smartphones, PPE, practical manual, etc.

					• Prepare conservation activity records.	
General Objective 6.0: Understand biodiversity monitoring, farm evaluation and record keeping practices						
14-15	6.1 Explain biodiversity monitoring practices. 6.2 Discuss farm evaluation in regenerative agriculture. 6.3 Explain biodiversity documentation requirements.	• Describe biodiversity monitoring and farm evaluation methods. • Discuss documentation and reporting procedures.	Textbooks, journals, charts, projector, white/smart boards, videos, internet, etc.	• Conduct biodiversity monitoring on selected crop fields. • Prepare biodiversity and regenerative farm records. • Compare ecological performance among plots. • Prepare simple regenerative agriculture report.	Guide students to: • Conduct biodiversity monitoring on selected crop fields. • Prepare biodiversity and regenerative farm records. • Compare ecological performance among plots. • Prepare simple regenerative agriculture report.	Record sheets, notebooks, biodiversity charts, smartphones, PPE, practical manual, etc.
COURSE ASSESSMENT: Course Work – 10% Test/Assignments – 10% Practical – 40% Examination – 40% Total = 100%						

**LIST OF MINIMUM RESOURCES/PHYSICAL FACILITIES
ORGANIC CROP PRODUCTION TECHNOLOGY (HND)**

A LABORATORIES

1. GENERAL BIOLOGY/MICROBIOLOGY/PATHOLOGY/PARASITOLOGY

S/N	ITEM	QUANTITY
1.	Autoclave	1
2.	Refrigerator	2
3.	Platinum wire loops	30
4.	Incubator	1
5.	Anaerobic jar	2
6.	Lovibond colour comparators	2
7.	Colony counter	1
8.	Centrifuge	1
9.	Water bath	1
10.	Electronic balance	2
11.	Microscopes Simple Compound	5 5
12.	Staining troughs	15
13.	Magnifying glasses	15
14.	Insect cages and cabinets	5
15.	Specimen bottles	20
16.	Insect nets	30
17.	Lamps	10
18.	Mist nets	10
19.	Cool boxes	10
20.	Oven	1

2. GENERAL CHEMISTRY/PLANT NUTRITION

S/N	ITEM	QUANTITY
1.	Centrifuge (Electric/ manual)	2

2.	Water bath (with rings & thermostat)	1 each
3.	Kipps Apparatus	1
4.	Column chromatograph / High Performance Liquid chromatograph (HPLC)	2
5.	Distillation apparatus	2
6.	Flame photometer	1
7.	Flame cupboard	2
8.	Hot plate	2
9.	Oven (Electric)	2
10.	Spectrophotometer (uv)	1
11.	Bunsen burner	30
12.	Electrophoresis equipment	1
13.	Manesty water distiller	1
14.	Vacuum pump	1
15.	Magnetic stirrer	2
16.	Rotary shaker	1
17.	Thermometer	20
18.	Heating mantle	2
19.	Khajeldhal Apparatus	1
20.	Paper chromatograph	2
21.	pH meter	2
22.	Balance (top Loading)	5
23.	Distillation apparatus	2
24.	Bomb Calorimeter	1
25.	Water sterilizer	1
26.	Soxhlet extraction apparatus	1
27.	Lovibond comparator	1
28.	Flash point	1
29.	Voltammeter (H-type/copper)	2 each
30.	Centrifuge	1
31.	Chemical balance	2

32.	Desiccator	2
33.	Pestle and mortar	2
34.	Flask shaker	2
35.	Grinder/blender	2
36.	Colorimeter	2

3. SOIL LABORATORY

S/N	ITEM	QUANTITY
1.	Drying oven soil	2
2.	pH Meter	3
3.	Electric furnace	1
4.	Electronic Balance	4
5.	Beam balance	2
6.	Soil sieve (2mm and 0.5mm mech.)	10 each
7.	Soil sedimentation apparatus	2
8.	Soil humidity determination apparatus	2
9.	Soil testing outfit	3
10.	Soil augers	30
11.	Humidity cabinet	1
12.	Soil moisture meter / Sensors	2
13.	Soil salt tester	2
14.	Flame photometer	1
15.	Spectrophotometer	1
16.	Kjedhal apparatus	1
17.	Nodule counter	1
18.	Micro-digester for N	2
19.	Colorimeter	2
20.	Water quality checker	1
21.	Cation exchange capacity determination apparatus	1
22.	Drying oven (plants)	1
23.	Vacuum pumps	1

24.	Sieve shaker (small)	3
25.	Bottle shaker	3
26.	Water bath	3
27.	Atomic Absorption Spectrophotometer (AAS)	1
28.	Soil capillarity determination apparatus	1
29.	Soil carbon determination apparatus	1
30.	Nematode detector	1
31.	Tetra Probe Soil Moisture Monitor	1
32.	Sensors (for precision agricultural practices)	20

B. STUDIO

1. DRAWING ROOM

S/N	ITEM	QUANTITY
1.	Drawing boards and tables (adjustable)	40
2.	Drafting set	40
3.	T square	40
4.	Set square	40
5.	Protractors	40
6.	Lettering set	40

2. AUDIO VISUAL ROOM/FACILITIES

S/N	ITEM	QUANTITY
1.	Video recorder	2
2.	Multimedia projector	2
3.	Magnetic board	2
4.	Public address system	2
5.	Smart Television Set	2
6.	Cameras	5
7.	Enlarger / Magnifying lens	5
8.	Digital printers	5
9.	Tables for drawing	10

10.	Water colours	20
11.	Drawing pencils	100
12.	Drawing pens	100
13.	Virtual Lab Software	1
14.	Display cabinets and boards	5
15.	Computers	5
16.	Extension box	5
17.	Dark room	1

C. WORKSHOPS

1. FARM MACHINERY SHED

S/N	ITEM	QUANTITY
1	Tractors	4
2	Disc plough	4
3	Disc harrows	4
4	Disc ridgers	4
5	Power tillers with complete implements	4
6	4-wheeled trailer	2
7	Stump jumper	5
8	Earth scoop	1
9	Rotovators	1
10	Versatile cultivators	1
11	Mould board ridger	2
12	Tractor wheel	2
13	Tractor pulley	2
14	Versa file seed loader	2
15	Seed drill	2
16	Combine harvester	1
17	Seed cleaner	1
18	Seed grader	2
19	Hay baler	1

20	Cutter bay mower	1
21	Rotary slasher	1
22	Fertilizer spreader	1
23	Multi-crop thresher	2
24	Forage shredder with cut hood Sub-soiler	1
25	Versatile mouldboard plough	2
26	Manual Planters	3
27	Spike toothed harrow	2
28	Rice planter	2
29	Root cutter	1
30	Interrow weeder	2
31	Manure spreader	1
32	Oscillatory belt	1
33	Belt Conveyor	1
34	Bucket elevator	1
35	Screw belt	1
36	Pneumatic conveyor	1
37	Auger conveyor	2
38	Grain moisture meter	2
39	Grain air flow meter	2
40	General Purpose Elevator	1
41	Planters	2
42	Harvester	2
43	Bailer	2
44	Pre-cleaner	1

2. CROP PROCESSING AND STORAGE FACILITIES

S/N	ITEM	QUANTITY
1	Rice milling machine	1
2	Multi-purpose thresher	1
3	Rice parboil machine	1

4	Groundnut decorticator	1
5	Maize sheller	1
6	Hand oil press	1
7	Grain drier	1
8	Cassava peeler	1
9	Cassava grater	1
10	Cassava presser	2
11	Garri toaster	2
12	Silos	Various size
13	Cribs	Various size
14	Yam barns	Various size
15	Rhumbus	Various size
16	Refrigerated warehouse	Various size
17	Paper bags	200
18	Waxes	50
19	Basket	200
20	Plastics Crates	50
21	Sorting machines	5
22	Size graders	2
23	Weight graders	2
24	Cleaning troughs	3
25	Slicing machines	2
26	De-stoner	2
27	Low temperature drier/blower	2
28	Refractometer	5
29	Penetrometer	5

3. WOOD/METAL/MAINTENANCE/BUILDING SERVICES WORKSHOP

S/N	ITEM	QUANTITY
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	WOOD WORK SECTION	
1.	Working benches with vices	10
2.	Band saw	5
3.	Surface planer	5
4.	Thickness planer	5
5.	Drilling machine	2
6.	HAND TOOLS Saws, chisel, tri-square, gauges, rulers, screwdrivers, set of drill bit, hammers, pincers, oil stones, planners etc.	15 each

4. METAL WORK SECTION

S/N	ITEM	QUANTITY
1.	Lathe machine	1
2.	Pipe benders	3
3.	Anvils	3
4.	Micrometers (insides, outside)	2
5.	Stock and dice set	5
6.	Drill sets	5
7.	Electrical hand drills	2
8.	Hydraulic jack 12 and 15 tons	1 each
9.	Tool boxes	3
10.	Battery charger	1
11.	Grease gun	2
12.	Pipe cutters	2
13.	Laser machine	1
14.	Scribers	1
15.	Steel ruler	5
16.	Mallet sets	2

17.	Pipe screwing – threading	2
18.	Arch welding equipment	2
19.	Working benches	8
20.	Electric grinder	2
21.	Welding gloves	15
22.	Welding helmet	15
23.	Wire brush	5
24.	Welding boots and screen Soldering equipment	15
25.	Blow torch	4
26.	Tin snips	4
27.	Soldering flux	4
28.	Sheet metal sheer	4
29.	Mallet hammer	4
30.	Hack saw	4
31.	Oxygen and acetylene bottles	2
32.	Oxygen and acetylene regulator	2
33.	Cylinder wrenches	3
34.	Spark lighter	5

5. MAINTENANCE WORKSHOP

S/N	ITEM	QUANTITY
1.	Tool box	5
2.	Hydraulic jack	2
3.	Service pit	1
4.	Teaching model or scraps of: Tractors engines Trailers Ploughs Other farm implements.	1 each

D. FIELD FACILITES

1. PEST CONTROL EQUIPMENT

S/N	ITEM	QUANTITY
1.	Knapsack pressure sprayer	2
2.	Motorized mist sprayer	1
3.	Handy sprayer	5
4.	Hand sprayer with container	5
5.	Solar/Battery Powered Sprayer	2
6.	Flood jet nozzles (1.5 Ok)	4
7.	Boom sprayer	2
8.	Flame weeder	2
9.	Colony counter	2
10.	Colony illuminator	2
11.	Fumigation sheets/envelopes	5
12.	Light trap	10
13.	Net trap	10
14.	Pheromone trap	10
15.	Insect boxes	10
16.	Protective Eye glasses / goggle	20
17.	Personal Protective Equipment (PPE)	20
18.	Duster applicator	5
19.	Granule applicator	5
20.	Electrodyne	2

2. SURVEYING EQUIPMENT

S/N	ITEM	QUANTITY
1.	Stereoscope	4
2.	GPS	5
3.	Prismatic compass	3
4.	Ranging pole	8
5.	Survey Chain	2
6.	Metric tape	2
7.	Drawing board	10
8.	Protractors	10
9.	Planimeter	1
10.	Theodolite	1
11.	Scale rule	15
12.	Set Square	10
13.	Set of arrows	30
14.	Damping Levels	4
15.	Abney Level	2
16.	T- square	10
17.	Pantograph	10
18.	Wheel tape	2

3. METEOROLOGICAL STATION

S/N	ITEM	QUANTITY
1.	Automated weather station	1
2.	Stevenson's screen	1
3.	Thermo-hydrographs	1
4.	Maximum and minimum thermometer	2
5.	Rain gauge	2
6.	Measuring glasses	2
7.	Wind vane	1

8.	Anemometers	2
9.	Evaporimeters	2
10.	Hygrometers	2
11.	Barometers	2

4. NURSERY TOOLS

S/N	ITEM	QUANTITY
1.	Watering system (spraying)	5
2.	Seed sowers	5
3.	Root pruners	5
4.	Plant lifters	5
5.	Flame weeder and hedgers	5
6.	G.H.P. pump	2
7.	Secateurs	10
8.	Planting hoes	10
9.	Spade	10
10.	Pick axe	10
11.	Hand trowel	10
12.	Wheel barrows	5
13.	Watering cans	10
14.	Head pans	10
15.	Machetes	10
16.	Cutting knives	10
17.	Nursery trays	10
18.	Cell trays	10
19.	Nursery bags	50
20.	Scissors	2
21.	Budding knife	5
22.	Budding tape	10
23.	Shears	5
24.	Sprayers	5

25.	Gardening line	10
26.	Dibbler	10
27.	Cutlass	10
28.	Chain saw	2

5. IRRIGATION EQUIPMENT

S/N	ITEM	QUANTITY
1.	Sprinkler irrigation kit 2,000 Hose	15
2.	Drip irrigation Kit for 1 ha	5
3.	Rotating sprinkler for 2 ha	10
4.	Big boss irrigation gun for 8 ha	10
5.	Centre pivot irrigation system for 4 ha	1
6.	Flow meter	2
7.	Irrigation water quality measuring equipment	2
8.	Water pump (2,3 and 5 inch)	1
9.	Solar/Battery powered water pump	2
10.	Weir	20
11.	Flumes	20
12.	Tetra Soil Probes	1
13.	Moisture Sensors	10
14.	Measuring tapes	10
15.	Artificial lake	1
16.	Rain water harvesting storage facilities	2
17.	Tensiometers	50
18.	Lysimeters	2
19.	Pan evaporator	2
20.	PVC pipe ($\frac{1}{2}$, $\frac{3}{4}$, 1, 2, and 3 inch)	100
21.	Siphon tubes	50

E. ORGANIC FARMS**1. CROP FARM (TEACHING AND COMMERCIAL)**

S/N	ITEM	QUANTITY
1.	Nursery	2 ha
2.	Pasture and Fodder crops	10 ha
3.	Hydroponic unit	1
4.	Horticultural farm (organic vegetables, herbs, spices, mushroom unit)	5 ha
5.	Orchard	5 ha
6.	Centre pivot irrigation system for 20 acres	1
7.	Crop farm: Tubers and Roots Cereals (Grains) Legumes Others	5 ha 5 ha 5 ha 5 ha
8.	Organic Fertilizer store	1
9.	Manure store	1
10.	Implement store	1
11.	Composting unit	1
12.	Manure curing unit	1
13.	Rain water husbandry	1

2. HYDROPONICS UNIT

S/N	ITEM	QUANTITY
1.	Surface tanks (Different sizes)	5
2.	Delivery pipes ($\frac{1}{2}$, $\frac{3}{4}$, 1, 2, and 3 inch)	10
3.	Submersible pumps (0.5 hp)	5
4.	Organic nutrient solutions	25 litres
5.	Pipes and connectors	10
6.	Seeding troughs	10
7.	Polystyrene covers/sheets	10
8.	Knives	5

9.	Pocket pH meter	2
10.	Pocket EC meter	2
11.	Stapler applicators and pins	5
12.	Strings	5
13.	Commercial organic hydroponic solutions	25 litres

3. MUSHROOMS UNIT

S/N	ITEM	QUANTITY
1.	Substrate / growing media	100 kg
2.	Mycelia (seed)	1 kg
3.	Polyethylene bags	500
4.	Racks	4 stages
5.	Compost	100 kg
6.	Thermometer	2
7.	Hydrometer	2
8.	Moisture meter	2
9.	Sterile work station/space	20 m ²
10.	Sterilizer	2
11.	Protected area	50 m ²
12.	pH meter	2
13.	Containers (sack, baskets)	20

4. OTHERS

S/N	ITEM	QUANTITY
1.	Green house / Screen house	2
2.	Processing and packing center	2
3.	Organic Agriculture sales outlet	1
4.	Crucible and lids	5
5.	Cassava mill	1
6.	CCTV apparatus	2

LIST OF PARTICIPANTS FINAL-CRITQUE WORKSHOP

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