



ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC(CGPA:3.68/4.00)
College with Potential for Excellence by UGC
DST-FIST Supported & STAR College Scheme by DBT

Part A Introduction	
Program: Certificate	Year: First Year
Session 2024-25	
Course Code	VI-ZOO-VERT
Course Title	Vermicomposting LEVEL-01
Course Type	Vocational
Pre-requisite (if any)	Open for all
Course Learning outcomes (CLO)	After studying this Course the Student will be able to: <ul style="list-style-type: none">• Understand concepts of biofertilizers like vermicomposting.• Understand techniques in Vermicomposting.• Get the opportunities of employment.• Improve the soil quality by promoting the biofertilizers.
Expected Job Role / career opportunities	Field Sales Executive in biofertilizers & vermicompost industry
Credit Value	4

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Part B- Content of the Course

Total No. of Lectures + Practical (in hours per week): L-1 Hr / P-1 Lab Hr

Total No. of Lectures/ Practical: L-30hrs/P-30hrs

Module	Topics	No. of Hours
I	<ol style="list-style-type: none"> 1. Vermicomposting : Introduction and Scope. 2. Types of Earthworm and Classification Epigeic, Endogeic, Diageic. 3. Life history of Earthworms (Earthworm Species <i>Eisenia foetida</i>). 	8
	<ol style="list-style-type: none"> 1. Objectives of Vermicompost. 2. Vermicompost Production : Establishment of Vermicomposting and Vermiwash unit. 3. Different Methods of Vermicomposting: Small and large scale Bed method, Pit method. 4. Harvesting the Compost , Storing and packing of vermicompost. 	12
III	<ol style="list-style-type: none"> 1. Precautions while Vermicomposting. 2. Physico- chemical analysis of vermicompost. 3. Physical Parameters of vermicompost. 4. Nutrient content of vermicompost and their role in agriculture. 5. Benefits of vermicompost, Pests and diseases of Earthworms. 	10
Practical		
I	<ol style="list-style-type: none"> 1. Scientific classification of Earthworm. 2. Study of external morphology of Earhworm- <i>Eisenia foetida</i>, <i>Lumbricus terrestris</i>, <i>Perionyx excavatus</i>, <i>Lampito mauritii</i> & <i>Lumbricus rubellus</i>. 3. Study of habit and habitat of Earhworm- <i>Eisenia foetida</i>. 4. Study of Digestive system of earthworm. 5. Study of Reproduction of earthworm. 	15
II	<ol style="list-style-type: none"> 1. Establishment of vermicomposting unit Pit method. 2. Establishment of vermicomposting unit Bed method. 3. Establishment of vermiwash unit. 4. Vermicompost production, harvesting and packaging. 5. Study of cocoon and vermicast. 6. Study of Pests and diseases of Earthworms. 	15

Project/ Field trip: Relevant field/ Industry Visit.

Program: Under Graduate Course		2 nd year	Session 2024-25
Course Code	V2 - 200 - VFRT		
Course Title	Advancements in vermicomposting		
Course Type	Vocational Certificate Course		
Pre-requisite (If any)			
Course Learning outcomes (CLO)	After studying this Course the Student will be able to: <ul style="list-style-type: none"> Understand methods and techniques in advance vermicomposting. Understand applied and economical vermicomposting. Get the opportunities of employment. 		
Expected Job Role / career opportunities	Field Sales Executive in biofertilizers & vermicompost industry		
Credit Value	2 (Theory) + 2 (Practical) = 04		

Part B: Content of the Course

Total No. of Lectures + Practical (in hours per week): L-1 Hrs / P-1 Hrs (=2 Hrs)		Total No. of Lectures/ Practical: L-30/P-30 (60 Hrs)
Module	Topics	No. of Hours (Total 30)
	1. Techniques & methods 1.1 Small Scale Earthworm farming for home gardens: Earthworm compost for home gardens. 1.2 Conventional commercial composting: Earthworm composting on larger scale. 1.3 Earthworm Farming (Vermiculture), Extraction (harvest), vermicomposting process. 1.4 Nutritional Composition of Vermicompost for plants and it's comparison with other fertilizers. 1.5 Vermiwash collection, composition and it's use. 1.6 Enemies of Earthworms, Sickness and worm's enemies. Frequent problems. How to prevent and fix them. Complementary activities of auto evaluation.	12
	2. Applied vermicomposting 2.1 The working group experience with <i>E. fetida</i> populations component with farm industrial residues (frigorific, cow places, feed-lot, aviaries exploitations and solid urban residues). 2.2 Characteristics of vermicomposting elaboration projects and considerations about economic aspects of this activity. 2.3 Research and ratability according to different exploitation orientations (worm's meat production, worm's humus production or integrated projects). 2.4 Toxins released by the worms (lignin like effects), complementary activities of auto evaluation.	10

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iii	3. Economics of vermicomposting 3.1 Harvesting, packaging, transport, storage and cost benefit analysis of vermicomposting and separation. 125 3.2 Uses of earthworms in food and medicine. 125 3.3 Recycle of food wastes in vermi-technology. 125	73
Practical		No. of Lessons
1	Identify different types of earthworms Field trip- Collection of native earthworms & their identification.	59
2	Study of Systematic position, habits, habits & External characters of <i>Eisenia fetida</i> .	110
3	Study of Life stages & development of <i>Eisenia fetida</i> .	
4	Study of Life stages & development of <i>Eudrilus eugeniae</i> .	
5	Comparison of morphology & life stages of <i>Eisenia fetida</i> & <i>Eudrilus eugeniae</i> .	
6	Study of Vermiculture, Vermiwash & Vermicompost equipments, devices.	
7	Preparation vermi-beds, maintenance of vermicompost & climatic conditions.	
8	Harvesting, packaging, transport and storage of Vermicompost and separation, study of worms diseases & enemies.	
9	Study the effects of vermicompost & vermiwash on any two short duration crop plants.	
10	Study the effects of sewage water on development of worms.	

Project/ Field trip

Part C Learning Resources

Text Books, Reference Books, Other resources

Suggested Readings:

1. Bhatt J.V. & S.R. Khanbata (1959) "Role of Earthworms in Agriculture" Indian Council of Agricultural Research, New Delhi
2. Dash, M.C., B.K. Senapati, P.C. Mishra (1980) "Vermis and Vermicomposting" Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, Jyoti Vihar, Orissa.
3. Edwards, C.A. and J.R. Lofly (1977) "Biology of Earthworms" Chapman and Hall Ltd., London.
4. Lee K.E. (1985) "Earthworms: Their ecology and Relationship with Soils and Land Use" Academic Press, Sydney.
5. Kevin, A and K.E. Lee (1989) "Earthworm for Gardeners and Fishermen" (CSIRO, Australia, Division of Soils) Rahudakar V.U. (2004). Gandhi Khatashivay Naisargeek Paryay, Atul Book Agency, Pune.
6. Satchel, J.E. (1983) "Earthworm Ecology" Chapman Hall, London.
- Wallwork, J.A. (1983) "Earthworm Biology" Edward Arnold (Publishers) Ltd, London.

Suggestive digital platforms web links:

http://agritech.nau.ac.in/org_farm/orgfarm_vermicompost.html

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 DR. U. S. PARMAR

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 12/12/22

Part A Introduction		
Program: Under Graduate Degree Course	Year: III Year	Session 2024-25
Course Code	V3-Z00-VERT	
Course Title	Vermicomposting and Sustainable Agriculture	
Course Type	Vocational LEVEL-03	
Pre-requisite (if any)	Diploma Course	
Course Learning outcomes (CLO)	After completion of course, Students will be able to: <ul style="list-style-type: none"> • Start Vermicomposting as an industry (Small scale, large scale). • Start farming for Sustainable Agriculture. • Get Certification & license for Vermicomposting marketing & sales. • Undertake research project on vermicompost technology. 	
Expected Job Role / career opportunities	<ul style="list-style-type: none"> • In Vermicomposting Industry. • Vermiculturist. • In ICAR (Indian Council for Agricultural Research). • Self Employment. • Start small scale industry. • Start Cottage industry for vermicomposting. • In marketing & sales management. 	
Credit Value	2 (Theory) + 2 (Practical) = 04	

Part B- Content of the Course

Total No. of Lectures + Practical (in hours per week): L-1 Hr / P-1 Lab Hr (= 2 Hr)

Total No. of Lectures/ Practical: L-30 /P-30hr (60hrs)

Unit 1	Vermicomposting as an Industry	No. of lectures (Total30)
	1.1 Segments of Vermicomposting Industry: <ol style="list-style-type: none"> a. Production aspects; Vermicomposting, testing, storage, packaging. b. Commercial aspects; Home gardening, horticulture, plant nursery, farming. c. Marketing aspects; Marketing channels for local for global marketing & sales. 1.2 Future aspects of vermicomposting.	10
Unit 2	Advantages of vermicomposting in sustainable agriculture	
	2.1 Vermicompost as a sustainable tool for environmental equilibrium. 2.2 Vermicompost as an effective option for recycling of organic farm waste. 2.3 Vermicomposting and microbial diversity of soil. 2.4 Vermicomposting for improvement in soil quality.	10
Unit 3	Standard and certification in vermicomposting	
	3.1 Quality criteria of vermicompost; <ol style="list-style-type: none"> a. Based on yield of crop. b. Based on available nutrients in vermicompost. 3.2 License & certificate required to start & organic business like vermicompost ; marketing <ol style="list-style-type: none"> a. At local level. b. At state level (Registration, Pollution board, waste management, GST Registration & fertilizer license). 3.3 Quality criteria and required certification, license for export of vermicompost.	10

Practical		No. of lectures 30
		6
1. Physical parameters: 1.1 Estimation of moisture in vermicompost. 1.2 Estimation of bulk density of vermicompost. 1.3 Estimation of pH values		10
2. Chemical parameters: 2.1 Quantitative analysis of vermicompost for total organic carbon. 2.2 Quantitative analysis of vermicompost for total organic nitrogen. 2.3 Quantitative analysis of vermicompost for total organic potassium. 2.4 Quantitative analysis of vermicompost for total organic sulfur 2.5 Quantitative analysis of vermicompost for total organic phosphorus		4
3. Test microbial presence in vermicompost: 3.1 Microbial test of vermicompost for presence of bacterial strain, 3.2 Microbial test of vermicompost for presence of fungi & its isolation.		2
4. How vermicompost is different from biocompost.		2
5. Field study of organic farming.		6
6. Visit an industry and market of vermicompost.		

Project/ Field trip

Part C-Learning Resources

Text Books, Reference Books, Other resources

Suggested Readings:

1. Herbert Berry, 2022: Vermicomposting (Worm forming), Maria Antonietta, Apicalla
2. Singh Keshav, 2014: "A textbook of Vermicompost: Vermiwash and Biopesticides" Pub. Biotech. Books.
3. Eiri Board, 2007: "Hand book of Biofertilizers & Vermiculture", Pub. Engineers India Research Institute.
4. Arvind Kumar, 2005: "Verm & Vermitechnology", Publisher: APII Publishing & Incorporation
5. P.K.Gupta, "Vermicomposting for Sustainable Agriculture", Publisher: Agrobios publication.
6. Training material on composting and vermicomposting compiled by Ecosan Services Foundation (ESF) and Seceon GmbH in the context of the Innovative Ecological Sanitation Network India (IESNI)
7. N.S. Subbarao, "Soil Microbiology"
8. S.K. Reddy, "Farming System and Sustainable Agriculture".

Suggested equivalent online courses: e-reading:

1. <https://www.startupyo.com>vermicomposting>
How to start vermicompost making business 2023?
2. <https://www.discuss.farmnest.com>lines>
Licenses and Permission vermicomposting unit-form.
3. <https://www.krishijagaran.com>blog>
How to start profitable vermicompost business.
4. <https://agrinfobank.pk>vermcomposting>
Vermicompost production, packaging & marketing: Pre. Feasibility study.
5. <https://www.agrifarming.in>vermicomposting>
Vermicompost business plan in India Agrifarming.
6. <https://m.youtube.com>watch>
7. Lecture 16 vermicomposting quality & marketing uploaded by IIT Khadakpur.

भाग अ - परिचय

कार्यक्रम: स्नातक डिग्री कोर्स

वर्ष: तृतीय वर्ष

सत्र: 2023-24

पाठ्यक्रम का कोड
पाठ्यक्रम का शीर्षक

V3-200-VERT

केंचुआ पालन एवं धारणीय कृषि

पाठ्यक्रम का प्रकार
पूर्वपिछा (Prerequisite)
(यदि कोई हो)

व्यावसायिक
डिप्लोमा कोर्स

पाठ्यक्रम अध्ययन की परिलिखियां
(कोर्स लर्निंग आउटकम) (CLO)

- पाठ्यक्रम का अध्ययन करने के बाद छात्र निम्न में सक्षम होगा:
- केंचुआ खाद निर्माण को लघु एवं बृहद उद्योग के रूप में प्रारंभ कर सकेगा।
 - सतत कृषि की शुरुआत करेगा।
 - केंचुआ खाद के विपणन एवं विक्रय हेतु प्रमाणपत्र एवं लायसेंस प्राप्त कर सकेगा।
 - केंचुआ खाद प्रौद्योगिकी पर शोध परियोजना समन्वय कर सकेगा।
 - केंचुआ खाद उद्योग में।
 - वर्मीक्यूचरिस्ट (कृमि कृषक)।
 - आई.सी.ए.आर. में (भारतीय कृषि अनुसंधान परिषद)।
 - स्वरोजगार।
 - लघु उद्योग प्रारंभ कर सकेगा।
 - केंचुआ खाद निर्माण हेतु कुटीर उद्योग।
 - विपणन एवं विक्रय प्रबंधन।

अपेक्षित रोजगार/ करियर के अवसर

क्रेडिट मान

2 (सैधांतिक) + 2 (प्रायोगिक) = 04

भाग ब- पाठ्यक्रम की विषयवस्तु

व्याख्यान की कुल संख्या + प्रैक्टिकल (प्रति सप्ताह घंटे में): व्याख्यान -1 घंटे / प्रैक्टिकल अवधि -1 घंटे कुल = 2 घंटे

व्याख्यान/ प्रैक्टिकल की कुल संख्या: L-30hr/P-30hr (60 hrs)

इकाई 1	केंचुआ पालन एक उद्योग	कुल घंटे
	<p>1.1 केंचुआ पालन उद्योग के प्रभाग:</p> <p>a. उत्पादन पक्ष; केंचुआ खाद निर्माण, जाँच, भण्डारण, पैकेजिंग।</p> <p>b. वाणिज्यिक पक्ष; गृह उद्यान, फलोद्यान, पौधों की नर्सरी, कृषि।</p> <p>c. विपणन पक्ष; स्थानीय एवं सार्वभौमिक विपणन एवं विक्रय हेतु चैनल।</p> <p>1.2 केंचुआ पालन के भावी पक्ष।</p>	10
इकाई 2	<p>धारणीय कृषि में केंचुआ पालन के लाभ</p> <p>2.1 पर्यावरण संतुलन के लिए केंचुआ खाद एक सतत साधन।</p> <p>2.2 जैविक कृषि के अपशिष्ट के चक्रिकरण हेतु केंचुआ खाद एक प्रभावी विकल्प।</p> <p>2.3 केंचुआ पालन और मिट्टी की सूक्ष्मजीव विविधता।</p> <p>2.4 मिट्टी की गुणवत्ता में सुधार हेतु केंचुआ पालन।</p>	10
इकाई 3	<p>केंचुआ पालन में मापदंड एवं प्रमाणीकरण</p> <p>3.1 केंचुआ खाद के गुणवत्ता मानदंड;</p> <p>a. उपज की मात्रा के आधार पर।</p> <p>b. केंचुआ खाद में उम्लव्य पोषक तत्वों के आधार पर।</p> <p>3.2 केंचुआ खाद जैसे जैविक व्यापार को प्रारम्भ करने के लिए आवश्यक प्रमाण पत्र एवं लायसेंस;</p> <p>a. स्थानीय स्तर पर।</p> <p>b. राज्य स्तर पर (पंजीकरण, प्रदुपण मंडल, अपशिष्ट प्रबंधन, जीएसटी पंजीयन एवं उर्वरक लायसेंस)।</p> <p>3.3 केंचुआ खाद के निर्यात हेतु आवश्यक गुणवत्ता मानदंड एवं आवश्यक प्रमाणन, लायसेंस।</p>	10
	प्रायोगिक पाठ्यक्रम	

		6
1. भौतिक मापदंड:		
1.1 केचुआँ खाद में नमी का आकलन।		
1.2 केचुआँ खाद के थोक घनत्व का आकलन।		
1.3 केचुआँ खाद की पी.एच. वैल्यू का आकलन।		10
2. रासायनिक मापदंड:		
2.1 कुल जैविक कार्बन हेतु केचुआँ खाद की मात्रात्मक विश्लेषण।		
2.2 कुल जैविक नाइट्रोजन हेतु केचुआँ खाद की मात्रात्मक विश्लेषण।		
2.3 कुल जैविक फोस्फोरस हेतु केचुआँ खाद की मात्रात्मक विश्लेषण।		
2.4 कुल जैविक सल्फर हेतु केचुआँ खाद की मात्रात्मक विश्लेषण।		
2.5 कुल जैविक फास्फोरस हेतु केचुआँ खाद की मात्रात्मक विश्लेषण।		4
3. केचुआँ खाद का सूक्ष्मजीव विश्लेषण:		
3.1 केचुआँ खाद का जीवाणु हेतु सूक्ष्मजीव विश्लेषण।		
3.2 केचुआँ खाद का फफूंद हेतु सूक्ष्मजीव विश्लेषण एवं प्रथकरण।		2
4. केचुआँ खाद जैविक खाद से किस प्रकार भिन्न है ?		2
5. जैविक खेती की फिल्ड स्टडी।		6
6. केचुआँ खाद उद्योग एवं बाजार का मुआयना करना।		

Project/ Field trip

भाग स- अनुशंसित अध्ययन संसाधन

पाठ्य पुस्तकें, संदर्भ पुस्तकें, अन्य संसाधन

अनुशंसित सहायक पुस्तकें /ग्रन्थ/अन्य पाठ्य संसाधन/पाठ्य सामग्री:

1. Herbert Berry, 2022: Vermicomposting (Worm forming), Maria Antonietta, Apicalla
2. Singh Keshav, 2014: "A textbook of Vermicompost: Vermiwash and Biopesticides" Pub. Biotech. Books.
3. Iiri Board, 2007: "Hand book of Biofertilizers & Vermiculture", Pub. Engineers India Research Institute.
4. Arvind Kumar, 2005: "Verm & Vermitechnology", Publisher: APII Publishing & Incorporation
5. P.K.Gupta, "Vermicomposting for Sustainable Agriculture", Publisher: Agrobios publication.
6. Training material on composting and vermicomposting compiled by Ecosan Services Foundation (ESF) and Seecon Gmbh in the context of the Innovative Ecological Sanitation Network India (IESNI)
7. N.S. Subbarao, "Soil Microbiology"
8. S.K. Reddy, "Farming System and Sustainable Agriculture".

अनुशंसित डिजिटल प्लेटफॉर्म वेब लिंक

1. <https://www.startupyo.com>vermicomposting>
How to start vermicompost making business 2023?
2. <https://www.discuss.farmnest.com>lines>
Licenses and Permission vermicomposting unit-form.
3. <https://www.krishijagaran.com>blog>
How to start profitable vermicompost business.
4. <https://agrinfobank.pk>vermcomposting>
Vermicompost production, packaging & marketing: Pre. Feasibility study.
5. <https://www.agrifarming.in>vermicomposting>
Vermicompost business plan in India Agrifarming.
6. <https://m.youtube.com>watch>
7. Lecture 16 vermicomposting quality & marketing uploaded by IIT Khadagpur.