To, The Principal SSES Amt's Science College, Congress Nagar, Nagpur-12

Subject: For permission to conduct the add on courses in the Department of Zoology during 2019-2020

Respected Sir,

This is to request you that, the teachers of our Zoology department have prepared the syllabus and modules of the 30 hours certificate courses for the session 2019-2020.

The details of the course module, syllabus and time table is submitted here with.

Hence please permit to run the add on courses and oblige me.

Thanking you

Date:- 22/06/2019

Yours sincerely

Dr. A. D. Bobdey
Professor & Head
Department of Zoology,
Shri Shivaji Science College,
Congress Nagar, Nagpur-12,

Permitted

Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur.

# Department of ZOOLOGY Certificate Course 2019-2020 Sustainable waste Management by Earthworm and Worm Manure

Date: 07/11/2019

#### **Notice**

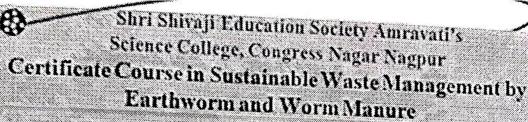
All the UG students of Zoology department are hereby informed that the Department of Zoology is conducting Certificate Course in "Sustainable waste Management by Earthworm and Worm Manure". Department provide opportunities to the students to learn Professional Skill, Professional Knowledge and Employability

The duration of certificate course is 10 weeks (30 Hrs.) from 2<sup>nd</sup> December 2019 to 5<sup>th</sup>5<sup>th</sup> February2020. This course contain per week 2 lectures and 1 practical Under the certificate course department conducts workshops, guest lectures by experts, student's participation in various competitions etc. Evaluation of the students takes place on the basis of examination of theory and practical. Last Date of Admission is 20<sup>th</sup> November 2019. The classes will be commencing from 2<sup>nd</sup> December 2019.

Interesting students of B.Sc. Part I, Part II & Part III should registered them self in early and contact to the Coordinator Dr. S.S.Deshmukh immediately (cont.no.7083790255)

Dr. Shital S.Deshmukh
Coordinator
Sustainable waste Management by
Earthworm and Worm Manure".

Department of Zoology





#### & Objective

- Worm Manure is to create high-quality natural fertilizer for soil by breaking down organic matter using worms.
- Worm Manure increases the fertility and water-resistance of the soil. Helps in germination, plant growth, and crop yield. Nurtures soil with plant growth hormones such as auxins, gibberellic acid, etc.
- To cultivate earthworms to increase their population and produce nutrient-rich compost.
- \* Worm Manure is an eco-friendly process that recycles organic waste into compost and produces valuable nutrients.
- The interested students will get the knowledge of composting later turn towards organic farming will help to maintain the environment pollution free.
- \* Free Certificate Course for College Students
  Duration 30 Hours (10 week)

Process of Registration-Interested students will be admitted

#### SSES Amravati's Science College, Congress Nagar, Nagpur-12

#### DEPARTMENT OF ZOOLOGY

#### COURSE MODULE AND SYLLABUS

Course Title: Certificate Course in Sustainable waste Management by Earthworm and Worm Manure

Course Coordinator: Dr. Mrs. Shital S. Deshmukh

#### Course description:

Worm Manure is known to be the world's best fertilizer. It is a method of preparing enriched compost with the use of earthworms. It is one of the easiest methods to recycle agricultural wastes and to produce quality compost. Earthworms consume biomass and excrete it in digested form called worm casts. Worm casts are popularly called as Black gold. Worm Manure is stable, fine granular organic manure, which enriches soil quality by improving its physicochemical and biological properties. It is highly useful in raising seedlings and for crop production. Worm Manure is becoming popular as a major component of organic farming system. Using Worm Manure can fulfill the requirements for organically grown products. Worm Manure is an environmental friendly process that recycles organic waste into compost and generates valuable nutrients.

#### **Course Objectives:**

The main objective of Worm Manure project is to produce organic manure of exceptional quality for the organically starved soil. Agricultural wastes, wastes from dairy and animal farms are usually dumped into at places resulting in a foul mess. By vermicomposting these wastes, they are not only utilized efficiently but also help in making a value-added product. The interested students will get the knowledge of composting .Students will be able to compost in a limited space and describe the decomposing process. They will also turn towards organic farming .It will help to maintain the environment pollution free.

Instructional Strategies: Theory class, Practical, Video clips, Models etc.

Evaluation Strategies: Oral discussions and Final MCQ examination.

Course outline: Course Outlines: (Relevance)

- Introduction: Importance of Worm Manure and an introduction to Worm Manure producers Earthworms: Biology of earthworms, identification of different types, and study of their external features
- Vermicomposting methods: Bed preparation, inoculation of earthworms, and management of the
- vermicomposting process Worm Manure: Harvesting, drying, packaging, transport, and storage of Worm Manure.

Worm Manure use: Benefits of vermicomposting and how to use Worm Manure Worm Manure use. Pests and diseases of earthworms, and measures to control them Pests and Collection, composition, and use of vermixes. Pests and disease. Collection, composition, and use of vermiwash. Vermiwash: Climatic principles of head

Vermiwash. Climatic principles of basic conditions

#### Course Outcomes (COs):

Course Outerstand importance of earthworms in soil fertility.

1. Understand importance of earthworms in soil fertility.

1. Understand with alternative ways to manage the wastes.

2. Familiarize with alternative ways to manage the wastes.

2. Familian 2. Familian 2. Familian 3. Understanding the role of worm farming in Modern Farming 3. Understanding the potential of vermices.

3. Understanding the potential of vermicompost as an alternative to chemical fertilizers 4. Understanding the health of soil and humans 5. Role of vermicultre in maintaining the health of soil and humans

6. Economic importance of Worm Manure.

6. Economic and Manure in protecting the environment and managing the waste

7. Role of the state of the sta

8. Students and thereby can get monthly income
9. To promote professional skills, entrepreneurship, knowledge and marketing skills through meaningful hands on experience through working in project mode. 10.To build confidence through end to end approach in project mode.

Duration of course: Ten weeks (30 Hours)

The Structure of Syllabus and system of evaluation -

Course	Theory Papers and Practical	Total Mark s	
		Theory	Practical
Certificate Course in Sustainable waste Management by Earthworm and	Theory paper- Sustainable waste Management by Earthworm and Worm Manure Theory Examination will be of MCQ pattern having 60 or 80 questions each with equal marks.	80	20
Worm Manure	* Practical examination will be based on performance evaluation in the laboratory	10	00

Internal Quality Assurance Cell (IQAC)

S. S. E. S. A. Science College Congress Nagar, Nagpur.

Principal S. S. E. S. Amravati's Science College, Nagpur.

#### **SYLLABUS**

#### Certificate Course in Sustainable waste Management by Earthworm and Worm Manure (10 weeks)

#### Theory-

#### Unit -1

- 1. Structure of Earthworm:
- 2. Earthworm Ecology: Distribution; Food habit and habitat; Ecological requirements:
- 3. Life cycle and Reproduction of Earthworm

#### Unit -2

- 1. Principle of Worm Manure
- 2. Methods of vermicomposting
- 3. WormManure: Physicochemical features of vermicompost; Role of earthwonn and vermicompost in growth of plants; Vermiwash and its utility in agticulture.

- 1. Applications of Worm Manure 1. Benefits of Worm Manure, Use of Worm Manure in agriculture. 2. Basic characteristics of earthworm suitable for vermicomposting.
- 3. Problems in vermicomposting

#### **Practicals**

- 1. waste materials:classification, disposal techniques, their segregation and processing.
- 2. key to identify different types of earthworms.collection of native earthworms and their identification study of life stages and development of Eisenia fetida.
- 3. Study of vermiculture, vermiwash and vermicompost equipmentss, devices
- 4. Bed preparation for Anarobic and Aerobic composition and mixing of beds. Maintenance of vermicompost and climatic conditions.

Distribution of marks: -Distribution of many disposal techniques 05

2 Classification, disposal techniques 05

3. Bed preparation and maintenance -10

#### Week-wise teaching plan:

Week	Hrs.	Syllabus
Week 1	1	key to identify different types of earthworms
	1	Earthworm Ecology: Distribution; Food habit and habitat; Ecological requirements
	1	Life cycle and Reproduction of Earthworm
Week 2	1.	Principle of Vermiculture
	2	Methods of vermicomposting
Week 3	1	Role of earthworm and vermicompost in growth of plants;
	2	Vermiwash and its utility in agticulture
Week 4	1	Physicochemical features of vermicompost
	1	Applications of vermiculture 1. Benefits of vermicompost
Week 5	2	Use of vermicompost in agriculture
	1	Problems in vermicomposting
Veek 6	2	waste materials
	1	classification, disposal techniques, their segregation and processing

Week 7	2	Bed preparation for Anarobic and
		Aerobic composition and mixing of beds
	1	Maintenance of vermicompost and
		climatic conditions.
Week 8	2	Low cost floor beds
	1	Tank system; Management during
		vermicornposting
Week 9	2	Laboratory techniques (Practical)
	1	Nutritional Composition of Worm
		Manure
Week 10	1	Conventional commercial composting -
		Earthworm Composting larger scale
	2	Enemies of Earthworms, Sickness and
		worm's enemies. Frequent problems. How to
		prevent and fix them.

# SSES AMT'S SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR-12 DEPARTMENT OF ZOOLOGY

Certificate Course : Sustainable Waste Management by Earthworm and Worm Manure

#### **Time Table**

(Duration  $2^{nd}$  December 2019 to  $5^{th}$  February 2020

Day	Theory	Practical
Friday	SSD (C9) Theory 4.00 PM - 5.00 PM	
Saturday	SSD (C9) practical, 4.00 PM – 5.00 PM	SSD (ZL) practical, 5.00 PM – 6.00 PM

Pr.

Shri Shivaji Education Society Amravati's SCIENCE COLLEGE, Congress Nagar, Nagpur.

### DEPARTMENT OF ZOOLOGY CERTIFICATE COURSE EXAMINATION (2019-2020)

Certificate Course: Sustainable waste
Management by Earthworm and Worm Manure

Date: 10/02/2020

#### **NOTICE**

All the admitted students of B.Sc. Zoology are hereby informed that the certificate course on "Sustainable waste Management by Earthworm and Worm Manure" examination will be held on 29/02/2020 (Saturday) at 4:00 pm to 5:30 pm in Zoology Laboratory at our college center. All Students should be present in the laboratory before 10 mins, of scheduled time of examination.

Dr. Shital S.Deshmukh
Coordinator
Sustainable waste Management by
Earthworm and Worm Manure

Department of Zoology

# Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur Session: 2019-20

#### DEPARTMENT OF ZOOLOGY

#### Certificate course in Sustainable waste Management by Earthworm and Worm Manure

Sr. No	Roll No		Name of Students			
1	101	Ku	Kuldeep Kaur	Bhagwant	S	
2 102		)2 Ambulkar Swaraj		Swaraj	S	
3	103	Ku	Banerjee	Tanushree	T	
4	104	Ku	Bhalerao	Riddhi	R	
5	105	Ku	Bhoge	Kshitij	S	
6	106	21.11	Bhopulkar	Rohit	S	
7	107	Ku	Bobde	Purva	P	
8	108		Bramhankar	Tushar	S	
9	109	Ku	Chawla	Sanjana	J	
10	110 Ku		Chauhan	Divya	L	
11 111		Dhepe	Himanshu	, <b>C</b>		
12	112	Ku	Dhoble	Srushti	V	
13	113	Ku	Dhomne	Gayatri	K	
14	114	Ku	Dhore	Ameya	R	
15	115	Ku	Fulare	Samiksha	V	
16	116		Fulmali	Siddhant	В	
.7	117	Ku	Gajbhiye	Isha	S	

18	118	Ku	Gawande	Mansi	C
19	119	Ku	Gedam	Sakshi	S
20	120	Ku	Gedam	Sayali	D
21	121		Ghonge	Pratik	D
22	122	Ku	Jayswal	Sweta	S
23	123	Ku	Mahant	Prnjali	A
24	124	Ku	Manwatkar	Nidhi	D
25	125	Ku	Mase	Shweta	S
26	126	1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Mhashakhetri	Tushar	D
27	127	12.	Meshram	Chahak	G
28	128	Ku	Mohite	Sakshi	S
29	129		Nasre	Mayur	G
30	130		Pillewan	Tushar	Н
31	131	Ku	Prabha	Kanchan	S
32	132	Ku	Raghatathe	Dhanashri	D
33	133	Ku	Arora	Taniya	<b>H</b> , ,
34	134	Ku	Asatkar	Akansha	K
35	135	Ku	Bhandarkar	Nayan	D
36	136	Ku	Bopche	Khushbu	Α
37	137	Ku	Feddewar	Prajakta	C
38	138	Ku	Gandhi	Khushi	R
39	139	Ku	Garodikar	Kiran	R
40	140	Ku	Gottiparthi	Anushadevi	R
41	141	Ku	Hande	Sanyukta	J

42	145	Ku	Kamble	Sahyadri	P
43	146	Ku	Khan	Tehseen	M
44	147	Ku	Kohad	Harshita	Н

Co-cordinator 8 .

Name: Dr. S. S. Deshmuke

Head of the Zoology Department

Dr. A. D. Bobdey
Professor & Head
Department of Zoology,
Shri Shivaji Science College,
Congress Nagar, Nagpur-12.

#### Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur Department of Zoology Academic Session 2019-20 DEPARTMENT OF ZOOLOGY

Certificate Course in

#### Sustainable Waste Management by Earthworm and Worm Manure MCQ TEST EXAMINATION

N.B.: Solve all the questions.  Tick for right answer  1) The presence of What causes the body colour of earthworms to change?  a) Blood b) Haemocyolin c) Haemocyonin d) Porphyrin 2) Which of the following species is most stable in Indian conditions? a) Perionyx b) Epiflis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionic excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting (d) Require regular monitoring (e) Require regular monitoring (f) Require regular monitoring (h) Require regular monitoring	Time: 45min	Maximum Marks: 80
1)The presence of What causes the body colour of earthworms to change?  a) Blood b) Haemoglobin c) Haemocyanin d) Porphyrin 2)Which of the following species is most stable in Indian conditions? a) Perionyx b) Epifilis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	N.B. : Solve all the questions.	POLL NO.
a) Blood b) Haemoglobin c) Haemocyanin d) Porphyrin 2) Which of the following species is most stable in Indian conditions? a) Periomyx b) Epifitis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting (d) Red worms are the best for vermicomposting (3) Time-consuming process (b) Require regular monitoring	✓ Tick for right answer	ROLL NO:
a) Blood b) Haemoglobin c) Haemocyanin d) Porphyrin 2) Which of the following species is most stable in Indian conditions? a) Periomyx b) Epifitis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting (d) Red worms are the best for vermicomposting (3) Time-consuming process (b) Require regular monitoring	1) The presence of What causes the body colour of earthworms to change?	(2)
c) Haemocyanin d) Porphyrin 2) Which of the following species is most stable in Indian conditions? a) Perionyx b) Epifilis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	a) Blood	
d) Porphyrin 2) Which of the following species is most stable in Indian conditions? a) Periomyx b) Epifilis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting? (d) Red worms are the best for vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
2) Which of the following species is most stable in Indian conditions?  a) Perionyx b) Epifilis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		T.
a) Perionyx b) Epifilis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
b) Epifilis c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	2) Which of the following species is most stable in Indian conditions?	(2)
c) Endogens d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
d) Aneciques 3) Which of the following is a commonly used earthworm species for the vermicomposting process? (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting (T) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		1
3) Which of the following is a commonly used earthworm species for the vermicomposting process?  (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called  (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
vermicomposting process?  (a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above  4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called  (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	,	(2)
(a) Eisenia fetida (b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		West of the second
(b) Perionix excavatus (c) Both (a) and (b) (d) None of the above 4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
(c) Both (a) and (b) (d) None of the above  4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called  (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding  5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above  6) Which of the following is false about vermicomposting?  (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting?  (a) Time-consuming process (b) Require regular monitoring		
(d) None of the above  4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called  (a) Humus  (b) Vermicompost  (c) Worm casting  (d) Compost bedding  5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium  (b) Nitrogen  (c) Phosphorus  (d) All of the above  6) Which of the following is false about vermicomposting?  (a) Worms population doubles in 90 days  (b) Worms eat double their body weight  (c) The wooden bin is best for vermicomposting  (d) Red worms are the best for vermicomposting?  (a) Time-consuming process  (b) Require regular monitoring		(A)
4) The highly decomposed organic matter rich in minerals like nitrogen, phosphorus, and potassium, in particular, produced from the activity of earthworms is called  (a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding 5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
particular, produced from the activity of earthworms is called	4) The highly decomposed organic matter rich in minerals like nitrogen, pho	osphorus, and potassium, in
(a) Humus (b) Vermicompost (c) Worm casting (d) Compost bedding  5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above  6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	particular, produced from the activity of earthworms is called	(2)
(b) Vermicompost (c) Worm casting (d) Compost bedding  5) Vermicompost is used as a biofertilizer because it is rich in (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above  6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	(a) Humus	<b>*</b>
(c) Worm casting (d) Compost bedding  5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above  6) Which of the following is false about vermicomposting?  (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting?  (a) Time-consuming process (b) Require regular monitoring		
(d) Compost bedding  5) Vermicompost is used as a biofertilizer because it is rich in  (a) Calcium  (b) Nitrogen  (c) Phosphorus  (d) All of the above  6) Which of the following is false about vermicomposting?  (a) Worms population doubles in 90 days  (b) Worms eat double their body weight  (c) The wooden bin is best for vermicomposting  (d) Red worms are the best for vermicomposting  7) Which of the following is not a drawback of vermicomposting?  (a) Time-consuming process  (b) Require regular monitoring		<b>†</b>
(a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above (e) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting (7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	(d) Compost hedding	8.
(a) Calcium (b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	5) Vermicompost is used as a biofertilizer because it is rich in	
(b) Nitrogen (c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	(-) Coloium	
(c) Phosphorus (d) All of the above 6) Which of the following is false about vermicomposting? (a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring		
(d) All of the above  6) Which of the following is false about vermicomposting?  (a) Worms population doubles in 90 days  (b) Worms eat double their body weight  (c) The wooden bin is best for vermicomposting  (d) Red worms are the best for vermicomposting  7) Which of the following is not a drawback of vermicomposting?  (a) Time-consuming process  (b) Require regular monitoring		
6) Which of the following is false about vermicomposting?  (a) Worms population doubles in 90 days  (b) Worms eat double their body weight  (c) The wooden bin is best for vermicomposting  (d) Red worms are the best for vermicomposting  7) Which of the following is not a drawback of vermicomposting?  (a) Time-consuming process  (b) Require regular monitoring	(c) Phosphorus	
(a) Worms population doubles in 90 days (b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	(d) All of the above	(2
(b) Worms eat double their body weight (c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	6) Which of the following is faise about verificomposting.	
(c) The wooden bin is best for vermicomposting (d) Red worms are the best for vermicomposting 7) Which of the following is not a drawback of vermicomposting? (a) Time-consuming process (b) Require regular monitoring	(a) Worms population doubles in 30 days	
(d) Red worms are the best for vermicomposting  7) Which of the following is not a drawback of vermicomposting?  (a) Time-consuming process  (b) Require regular monitoring	(b) Worms eat double their body weight	*
(d) Red worms are the best for vermicomposting  7) Which of the following is not a drawback of vermicomposting?  (a) Time-consuming process  (b) Require regular monitoring	(c) The wooden bin is best for vermicomposing	A STATE OF
7) Which of the following is not a drawback of verificomposting:  (a) Time-consuming process  (b) Require regular monitoring	(d) Pad worms are the hest for vermicomposing	
(a) Time-consuming process (b) Require regular monitoring	7) Which of the following is not a drawback of vermicomposting?	
(b) Require regular monitoring	(a) Time-consuming process	
(c) Require minimum temperature	(b) Require regular monitoring	
	(c) Require minimum temperature	

8) Kitchen wastes and animal excreta can be minimized most profitably via  (a) vermiculture (b) biogas production (c) direct usage as biofertilizers (d) storing in under	
	(2)
a) Epifilis species has a shorter	
b) Endogens	
c) Aneciques	(2)
d) Eudrilus	(2)
10) Which of the following is true about vermiculture? (a) Composting using rats (b) Composting using rats	
(a) Composting using rats  (b) Composting using rats	
(b) Composting using rats (c) Composting using birds (d) All of the all	(2)
	(-)
11) Which of the c. "	
(a) Vermicompost is red in colour  (b) Vermicompost is led in colour	
	(2)
(c) Vermicompost is black in colour (d) Vermicompost is white in colour	(2)
12) Which of the following are the best worms used for composting?  (b) Pink worms	
(a) Maggots are the best worms used for composting?	d.
(b) I lik worms	(2)
(c) Red wigglers	
(d) All of the above	
13) The moisture level required for	
13) The moisture level required for vermicomposting should be between	(2)
(b) 40 and 50 per cent	(2)
(c) 70 and 80 per cent	
(d) Above 90 per cent	
14) The maximum temperature required for vermicomposting is	1 de la companya de l
(a) 20C to 25C	(2)
(b) 25C to 30C	
(c) 30C to 35C	
(d) 35C to 40C	
15) Which of the following is not a drawback of vermicomposting?	(2)
(a) Time-consuming process	(2)
(b) Require regular monitoring	
(c) Require minimum temperature	14
(d) Enriches soil with microorganisms	(2)
16) Which of the following is not raw material required for preparing composts?	(-)
(a) Cow dung	
(b) Weed biomass	
(c) Dry straw and leaves	
(d) All of the above	? (2)
(d) All of the above  17) Which of the following procedures are used by the farmers to multiply the earthworms	• (-)
(a) By adding cow dung	
(a) By adding con the control of the	
(a) By adding plant materials (b) By adding plant materials (c) By mixing more amount of biodegradable wastes	
(c) By mixing more amount or	
(d) All of the above	(2)
(d) All of the above  18) Which of the following products cannot be used for vermicomposting?	
(a) Cow dung	
(b) Plant materials	
(b) Flant masses	

(c) Animal Wastes (d) All of the above	
19) Meat involved in composting?	
a) beene	
b) Leech	(2)
c) Snail	(2)
d) Earthworm	
20) Vermicomposting is a natural process	
a) I roducing compost	(2)
b) Waste management creates it c) Producing worms	(2)
d) Destroying worms	
21) Which among the following is not	
21) Which among the following is not a major reason for choosing earthworms for Vermicomposting a) Low incubation time	2 (2)
b) Digestion rate	? (2
c) Adaptability	ĺ
d) Low growth rate	1
22) Which of the following species of earthworms is not suitable for Vermicomposting?	Ÿ
a) Epifilis	(2)
b) Endogens	)
c) Aneciques	•
d) Plasmodium	-
23)Earthworms subsidize to the burial of wastes?	(2)
a) True	(2)
b) False	
24) Which of the following is not a method of worm cast harvesting or manufacturing?	(2)
a) Homogenization	
b) Active feeding	
c) Drying under adequate light	
d) Separation of cocoons	
25) What is the major advantage of three-tire vermi-culture technology?	(2)
a) It can be applied to both solid and liquid wastes	
b) It cannot be applied to both solid and liquid wastes	
c) It involves chemical treatment	
d) It can degrade organic wastes	
26) The process in which earthworms are used to degrade organic wastes is	(2)
(a) Compost bedding	
(b) Humus forming	
(c) Vermicomposting	
	(2)
(d) None 27) Kitchen wastes and animal excreta can be minimized most profitably via	(2)
(27) Kitchen wastes and university	
(a) vermiculture	
(b) biogas production	
(c) direct usage as biofertilizers  (c) direct usage as biofertilizers	
(d) storing in underground storage tanks (d) storing in underground storage tanks 28) While burrowing, the anterior ends of earthworms become turgid serving as a hydraulic ske	leton though
28) While burrowing, the anterior chas a result of	(2)
28) While burrowing, the anterior ends of they do not possess a skeleton. This is as a result of	
(a) setae	
(b) out peristalsis	
(a) coelomic fluid	
(d) none of the above	(2)
20)Vermicompost is a/an	
(a) toxic material	
(b) organic biofertilizer	
(c) inorganic fertilizer	
(d) synthetic fertilizer	
(a) synthetic letter-	

	/	
	30)This can be the best worm for composting (a) pink worms	
	(a) pink worms	
7	(b) red wigglers	
	(c) maggots	(2)
	31)In earthworms, typhlosome is a	(2)
	(a) exerción y structura	
	(b) a circulatory system structure	1927
	(c) fold of intestine	(2)
	(d) defence mechanism	
	(a) Phasels of the following nutrients is abundantly f	
	32)Which of the following nutrients is abundantly found in worm castings?  (b) Nitrogen	
	(b) Muogen	(2)
	(c) Calcium and other minerals	
	(d) All of these	
	33)At which of these segments does the nerve cord of the earthworm divide into two parts?	
	a) 5th, 6th	(2)
	0,0,0	(2)
	c) 3 <sup>rd</sup> , 4 <sup>th</sup>	ž
	34) Which of these statements is true about nerve ring? a) It has only sensory function	
		(2)
	b) It has only motor function	(2,
	c) It is present on the dorsal side	0
	35) Larvae are formed during 41	
	35) Larvae are formed during the development of earthworms. True or false?	03
	b) False	(2)
		11
	36) Where does fertilization occur for the earthworm?	(2)
	a) Ovary	
	b) Spermathecae	
	c) Cocoon	
	d) Female genital pore	21
	37) Which of these statements is true about earthworm?	(2)
	a) They are harmful for agriculture	1 L S
	b) They are used as fishing bait	1
	c) They decrease soil fertility	And in the second
	d) They cannot live in burrows	4.7
	38)Earthworm is placed under which group?	(2)
		1
	a)Hirudinea	2000年
	b)Polychaeta	10
	c)Crustacea	<b>(4)</b>
,	d)Oligochaeta 39)The presence of What causes the body colour of earthworms to change?	(2)
	39) The presence of What causes the body colour	CF 1 Cap
	a) Blood	-
ì	) Haemoglobin	3
	11-moovenin	
•	i) Porphyrin i) Porphyrin ii) The animal does not show any metamorphosis of larval Stage	(2)
(	to relative animal does not show any metamorphosis of the same	and a second
4	(U) I ne allillar according	
8	)Musca domestica	-
ł	o)Asteria	
	Duttorfly	
(	Pheretima Posthuma	



#### Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur Session: 2019-20

#### DEPARTMENT OF ZOOLOGY

## Certificate course in Sustainable waste Management by Earthworm and Worm Manure

Sr. No	Roll No		Name of Students			signature
1	101	Ku	Kuldeep Kaur	Bhagwant	S	P2C
2	102		Ambulkar	Swaraj	S	Swazaj
3	103	Ku	Banerjee	Tanushree	Т (	Town
4	104	Ku	Bhalerao	Riddhi	R	·k
5	105	Ku	Bhoge	Kshitij	S	Derege
6	106		Bhopulkar	Rohit	S	@w=
7	107	Ku	Bobde	Purva	P	( Deurvai
8	108		Bramhankar	Tushar	S	T. Broamhankarr
9	109	Ku	Chawla	Sanjana	J	Shur
10	110	Ku	Chauhan	Divya	L	Divya
11	111		Dhepe	Himanshu	С	(1) Thepe
	112	Ku	Dhoble	Srushti	V	Sphokla
12		Ku	Dhomne	Gayatri	K	Shame
13	113	Ku	Dhore	Ameya	R	Fehore
14	114		Fulare	Samiksha	V	amilkoha
15	115	Ku		Siddhant	В	Solulma
16	116		Fulmali	Isha	S	Soluma
17	117	Ku	Gajbhiye	1811a		1

B.Sc.

5

1

2

-						
18	118	Ku	Gawande	Mansi		
19	119	Ku	Gedam		C	Marst_
20	120	Ku	Gedam	Sakshi	S	Calkedri
21	121	-	Ghonge	Sayali	D	Sarris
22	122	14		Pratik	D	Sayali
		Ku	Jayswal	Sweta	S	Paratile
23	123	Ku	Mahant	Prnjali		Sweta.
24	124	Ku	Manwatkar	Nidhi	Α (	Longely
25	125	Ku	Mase		D	Midhi
26	126			Shweta	S	Thaske
		1	Mhashakhetri	Tushar	D	maske
27	127		Meshram	Chahak	G	More
28	128	Ku	Mohite	Sakshi	S	Calshi.
29	129		Nasre	Mayur	G	Mayers.N.
30	130		Pillewan	Tushar	Н	Tusher.
31	131	Ku	Prabha	Kanchan	S	Mayeur.N.  Tushor.  Kanihar.
32	132	Ku	Raghatathe	Dhanashri	D	
33	133	Ku	Arora	Taniya	Н	1 hanshm
34	134	Ku	Asatkar	Akansha	K	A. Asatkar.
35	135	Ku	Bhandarkar	Nayan	D	Mortar
36	136	Ku	Bopche	Khushbu	Α	Shuphoo
37	137	Ku	Feddewar	Prajakta	С	C Comments
38	138	Ku	Gandhi	Khushi	R	L. Gandhi
39	139	Ku	Garodikar	Kiran	R	MON
40	140	Ku	Gottiparthi	Anushadevi	R	Anu
41	141	Ku	Hande	Sanyukta	J	Wande

the

1

145	Ku	Komble				
		Kamble	Sahyadri	P	s.kamble	
146	Ku	VI			8. 60.	
		IXu	Knan	Tehseen	M	whar
147 Ku	V.,	IZ 1				
	147	Ku Kohad	Harshita	Н	Alkohad	
	146	146 Ku	146 Ku Khan	146 Ku Khan Tehseen	146 Ku Khan Tehseen M	

Co-cordinator

Name:

Head of the Zoology Department

Dr. A., D. Bobdey
Professor & Head
Department of Zcology,
Shri Shivaji Science College,
Congress Nagar, Nagpur-12.

# Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur Session: 2019-20

#### DEPARTMENT OF ZOOLOGY

#### Certificate course in Sustainable waste Management by Earthworm and Worm Manure

Sr. No	Roll No		Name of Students			Total marks		Total Marks	Grades
1	101	Ku	Kuldeep Kaur	Bhagwant	S	Theory	Practical	4	
2	102		Ambulkar	Swaraj	S <sub>i</sub>	60	17	77	A+
3	103	Ku	Banerjee	Tanushree	T	65	18	83	A+
4	104	Ku	Bhalerao	Riddhi	R	63	15	78	A+
5	105	Ku	Bhoge	Kshitij	S	70	16	86	A+
6	106		Bhopulkar	Rohit	S	67	17	84	A+
7	107	Ku	Bobde	Purva	P	60	12	72	A
8	108		Bramhankar	Tushar	S	59	15	74	A
9	109	Ku	Chawla	Sanjana	J	70	16	86	A+
10	110	Ku	Chauhan	Divya	L	68	17	85	A+
11	111		Dhepe	Himanshu	С	67	18	85	A+
12	112	Ku	Dhoble	Srushti	V	56	14	70	A
13	113	Ku	Dhomne	Gayatri	K	59	18	77	<b>A</b>
14	114	Ku	Dhore	Ameya	R	69	14	83	A+
15	115	Ku	Fulare	Samiksha	V	61	16	77	Α
16	116		Fulmali	Siddhant	<b>B</b> .	64	13	77	A
17	117	Ku	Gajbhiye	Isha	S	60	16	76	A A
18	118	Ku	Gawande	Mansi	С	59	15	74	A

19	119	Kı	Gedam	Sakshi	S	55	17	72	Α
20	120	Ku	Gedam	Sayali	D	63	13	76	A
21	121		Ghonge	Pratik	D	57	13	70	Α
22	122	Ku	Jayswal	Sweta	S	61	16	77	A+
23	123	Ku	Mahant	Prnjali	A			Absent	Absent
24	124	Ku	Manwatkar	Nidhi	D	49	14	63	A
25	125	Ku	Mase	Shweta	S	46	13	59	A
26	126		Mhashakhetri	Tushar	D	59	15	74	A
27	127		Meshram	Chahak	G	48	16	64	, A
28	128	Ku	Mohite	Sakshi	S	59	14	73	A
29	129		Nasre	Mayur	G	62	15	77	A
30	130		Pillewan	Tushar	Н	58	17	75	A+
31	131	Ku	Prabha	Kanchan	S	55	14	69	A
32	132	Ku	Raghatathe	Dhanashri	D	60	15	75	A
33	133	Ku	Arora	Taniya	Н	53	16	79	A
34	134	Ku	Asatkar	Akansha	K	61	17	78	A
35	135	Ku	Bhandarkar	Nayan	D	49	16	65	A
36	136	Ku	Bopche	Khushbu	Α	60	13	73	A
37	137	Ku	Feddewar	Prajakta	C	64	17	81	A+
38	138	Ku	Gandhi	Khushi	<u> </u>			Absent	Absent
39	139	Ku	Garodikar	Kiran	R	68	14	82	A+
40	140	Ku	Gottiparthi	Anushadevi	R	69	15	84	A+
41	141	Ku	Hande	Sanyukta	J	73	16	89	A+
42	142	Ku	Kamble	Sahyadri	P	70	15	85	A+

43	143	Ku	Khan	Tehseen	M	65	16	81	A+
44	144	Ku	Kohad	Harshita	Н	71	17	88	Á+

Co-cordinator

Name: Dr. 5.S. Deshmular

Head of the Zoology Department

Dr. A. D. Bobdey Professor & Head Department of Zoology, Shri Shivaji Science College, Congress Nagar, Nagpur-12.

#### SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S SCIENCE COLLEGE DEPARTMENT OF ZOOLOGY

Report 1019-20

#### Certificate Course in Sustainable waste Management by Earthworm and Worm Manure

The plow is one of the most ancient and most valuable of Man's inventions; but long before he existed, the land ... was regularly ploughed, and still continues to be ploughed, by earthworms. It may be (doubtful) whether there are many other animals which have played so important a part in the history of the world as these lowly, organized creatures.

#### Charles Darwin, 1881

Worm Manure is the practice of using worms to turn organic waste into nutrient-rich fertilizer. Vermicomposting is basically a managed process of worms digesting organic matter to transform the material into a beneficial soil amendment. Developing country like India. Firstly, it makes way for utilization of available organic wastes to produce the rich source of organic manure of high quality, which is superior to other types of organic manures in its physico-chemical and biological properties. Secondly, the manure is produced in a shorter duration of time of six weeks and is a fully matured, homogenous matter. Thirdly, the programme provides job opportunities for the unskilled labour force. Finally, it is the best way of safe guarding the environment. Vermicompost (compost produced by the activity of selected species of earthworms) has been adjudged as the best source of organic amendments to soil. Using vermicompost can fulfill the requirements for organically grown products.

Certificate Course in Sustainable waste Management by Earthworm and Worm Manure was under taken by the students of B.Sc.II,III as a part of additional academic curriculum under the guidance of Dr.S.S.Deshmukh with view to provide complete knowledge of Earthworm and Worm Manure which will be beneficial for the student for self employment with little investment future. Forty four students participated in this certificate course in Sustainable waste Management by Earthworm and Worm Manure. In the present investigation, the study is carried out on the proper utilization of agriculture waste from market yard through vermicomposting and obtaining the nutrient rich organic manure.

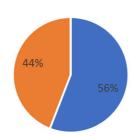
There is no such thing as waste, for one organism's waste is another's resource.

**Action taken:** Vermicomposting offers students a hands on learning experience, integrated science, nature and sustainability concepts. It fosters environmental awareness, critical thinking and STEM education preparing students for sustainable practices and careers.

#### Feedback analysis

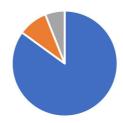
How would you rate the overall quality of the course content?

- excellent
- good
- average
- poor



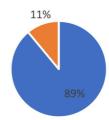
How effective were the practical sessions in enhancing your understanding of vermicomposting techniques?

- very relevent
- relevant
- somewhat relevant
- not relevent



How well did the course meet your expectations in terms of knowledge and skills gained?

- excellent
- good
- average
- poor



How likely are you to recommend this course to your colleagues or peers?

- very likely
- likely
- unlikely
- very unlikely

7%0%0%

Internal Quality Assurance Cell (IQAC)

S. S. E. S. A. Science College Congress Nagar, Nagpur.



Principal S. S. E. S. Amravati's Science College, Nagpur.



Shri Shivaji Education Society Amravati's

# SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

Accredited with CGPA of 3.51 at 'A+' Grade A College with Potential for Excellence



# CERTIFICATE

entitled, Certificate course in "Sustainable Waste Management by Earthworm and Worm Manure" Tanushree, Someries is awarded with certificate on successful completion of the course

SSESA's, Science College, congress Nagar, Nagpur 440012. Session 2023-24 under Add-on course conducted for 30 hours from 02 /12/ 2019 to 05 /02/ 2020 by Department of Zoology,

He/She has passed the Examination with '\_\_' Grade.

Sing

**Dr. Ms. Shital Deshmukh**Coordinator, Department of Zoology

rof. M. P. Dh

**Prof. M. P. Dhore**Principal, Science College, Nac