

Parvatibai Chowgule College of Arts and Science
Autonomous

7.1.3 Facilities in the Institution for the management of the following types of degradable and non-degradable waste

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A. SKILL ENHANCEMENT COURSE ON ‘WASTE MANAGEMENT TECHNIQUES’

WASTE MANAGEMENT TECHNIQUES - SYLLABUS

COURSE OBJECTIVES

- To familiarize students with the techniques of waste management
- To encourage students to get hands on experience on techniques of managing waste
- To help students understand the importance of reducing, reusing and recycling

COURSE OUTCOME

CO1: Understand concept of types of waste, its transport and disposal.

CO2: Perform composting techniques / procedures.

CO3: Identify means of reducing waste production.

CO4: Plan and conduct research in areas of waste management

MODULE 1: Introduction to waste management

UNIT 1: Overview of types of waste, collection, transport, treatment and disposal of waste.

UNIT 2: Waste generated- sources, and management, Storage and collection of different kinds of wastes.

UNIT 3: Need for Waste management and effect on the community.

UNIT 4: Waste treatment methods: Physicochemical Treatment of Solid and Hazardous Waste, Chemical treatment processes, Biological Treatment of Solid and Hazardous Waste, 3 Rs- Reuse Reduce and Recycle.

MODULE 2: Composting Techniques

UNIT 5: Soil structure and its maintenance.

UNIT 6: Organic composting- Methods, Procedure - Microorganisms, materials used, design and maintenance, Biogas.

UNIT 7: Vermicomposting- Earthworms – biology- life cycle and feeding. Types – morphological and ecological grouping – Epigeic, Anecic and Endogeic species,

Nutrient value of worm cast/vermicompost, requirements of vermicomposting, Maintenance of composting – Collection of vermicompost Small Scale Earthworm

farming for home gardens. Marketing the products of vermiculture, Predator/pathogen control

MODULE 3: Waste management Techniques and Rules

UNIT 8: Sewage disposal; Medical waste management. Sources, measures and health effects; disposal options

UNIT 9: Bioremediation, ground water contamination and remediation Landfill designing and Incineration.

UNIT 10: Radioactive and E- waste management-Sources, measures and health effects.

UNIT 11: Relevant Regulations-

- Municipal solid waste (management and handling) rules (SWM 2000 and amendments of 2016: SO.1357 (E) Sec. 3(II).
- Hazardous waste (management and handling) rules 2015(Chapter II and IV; Schedule I, II, III and IV).
- Biomedical waste handling rules 2016 (GSPCB – Schedule I and II).
- Plastic waste management rules 2016 (Part-II, Section-3, Sub-section (i))

MODULE 4: PRACTICE BASED

Practice of the following: The students of this course are expected to work on these different waste management practice activities:

- 1) Leaf composting on campus
- 2) Vermicomposting
- 3) Awareness on waste segregation.
- 4) Waste collection Drives.
- 5) Research on waste management.
- 6) Case studies/ mini projects.

The report of the same will be submitted as portfolio.

REFERENCE BOOKS:

1. Edwards CA, Hendrix P and AranconN (2014) Biology and Ecology of Earthworms, Springer Publishers.
2. Karaca A (2011) Soil Biology: Biology of Earthworms. Springer Publishers.
3. Edwards CA, Arancon NQ and Sherman RL (2011) Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management, CRC Press, USA.
4. Ranganathan LS (2006) Vermibiotechnology– From Soil Health to HumanHealth. Agrobios, India.
5. Ismail SA (2005) The Earthworm Book. Edition, Other India Press, Apusa, Goa, India.

6. Ismail SA (1997) Vermicology: The Biology of Earthworms. Orient Longman, India.
7. A. D.Bhide and B.B.Sundaresan, "Solid Waste Management –Collection, Processing and disposal" Mudrashilpa Offset Printers, Nagpur, 2001.
8. Biomedical waste (Management and Handling) Rules, 1998.

B. GENERIC ELECTIVE COURSE ON ‘VERMICOMPOSTING TECHNOLOGY’

COURSE OBJECTIVE

This paper provides an insight to create awareness among students on mushroom cultivation and organic vermicompost production from biodegradable wastes using earthworms.

LEARNING OUTCOME

On completion of this module, students will be able to understand the importance of vermicompost production for sustainable environment management.

VERMICOMPOSTING TECHNOLOGY - Syllabus

Introduction to Vermicomposting

Meaning, history, economic importance, value in maintenance of soil structure, role in recycling of organic wastes

Selection of the worms

Choosing the right worm; Useful species of earthworms; Local species of earthworms; Exotic species of earthworms; working with worms: bedding; food source; moisture, aeration; protection against predators

Vermicomposting technology

Requirements for vermicompost production- site selection, selection of suitable earth worm, selection of food, selection of bedding material

Methods of vermicomposting- Pit or pot method- Heap method, Bin or tray method, Windrow method, Wedge system, Vermi-reactor system

Harvesting - Manual methods, Self-Harvesting (migration) methods, Mechanical methods

Nutritive value of vermicompost, Overview of Potential Benefits and Constraints

Vermi-wash collection, composition & Use

General problems in vermicomposting, Prospects of vermicomposting as self-employment venture.

References

1. R.K. Bhatnagar & R.K. Palta, Earthworm Vermiculture and Vermicomposting. Kalyani Publishers, Chennai.
2. P.K. Gupta, Vermi Composting for Sustainable Agriculture. Agrobios (India), Jodhpur.