



GU/Acad –PG/BoS -VAC/2025-26/215

Date: 14.07.2026

CIRCULAR

The approved syllabus of the following Value Added Courses for Post Graduate Programmes governed under Ordinance OA-35A is attached.

Sr. No.	Course Code	Course Title
1.	VAC-1501	Fundamentals of Solid Waste Management
2.	VAC-1502	Fundamentals of Industrial Waste Management

These courses shall not be considered for the calculation of CGPA and shall be over and above the 80 credits required for completion of the Programme.

The Deans/Vice-Dean (Academic) of the Schools/Faculty, Programme Directors and the Principals of all the affiliated Colleges offering the Programmes under Ordinance OA-35A are requested to take note of the above and bring the contents of this Circular to the notice of all concerned.

(Ashwin V. Lawande)
Deputy Registrar – Academic

To,

1. The Deans/Vice-Dean (Academic) of the Schools/Faculty, Goa University.
2. The Programme Directors, Goa University
3. Principals of all the affiliated Colleges offering the Programmes under Ordinance OA-35A.

Copy to:

1. Controller of Examinations, Goa University.
2. Assistant Registrar Examinations (PG), Goa University.
3. Director, Directorate of Internal Quality Assurance, Goa University for uploading the Syllabus on the University website.

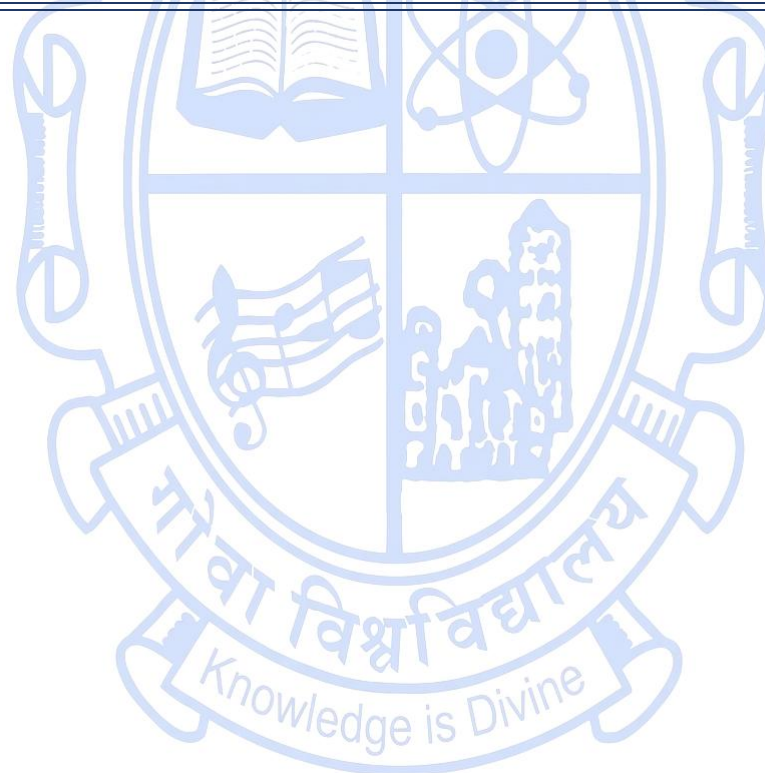
VALUE ADDED COURSES

Title of the Course	Fundamentals of Solid Waste Management (Value added course)
Course Code	VAC-1501
Number of Credits	1.5 (T) + 0.5 (P)
Theory/Practical	Theory & Practical
Level	500
Effective from AY	2025-26
New Course	Yes
Value added Course	Yes
Course for advanced learners	Yes

Pre-requisites for the Course:	Should have studied science at UG level.
Course Objectives:	1. To understand the problems related to waste generation and identify methods and processes for waste treatment 2. To provide exposure of govt facilities and industrial setups in the state for waste management
Course Outcomes:	Students will be able to
	CO 1. Explain different concepts of waste management
	CO 2. Analyze day-to-day human activities related to solid waste generation

	CO 3. Identify sustainable methods for solid waste disposal.	
	CO 4. Demonstrate the processes involved in the solid waste treatment	
Content:		No of hours
Module 1:	Introduction to Waste Management, Principles and Procedures, Types of Waste	4
Module 2:	Classification of solid waste; Functional elements of solid waste management; Main sources of solid waste generation; Waste handling and separation, storage and processing at the sources; Solid waste collection; Recycling and reuse; Types of waste-to-energy systems	10
Module 3:	Common solid waste disposal methods: Composting; Controlled tipping/Burying; Incineration; Ploughing in fields; Other disposal methods.	5
Module 4:	Sustainability, Environmental impact, Case studies on waste management (Waste management in Indore, Mumbai, Antarctica, etc.)	4
Module 5:	Field trip – Solid waste management facility in Goa (in- house waste management facility as well as outside campus like Taleigao, Saligao, etc.)	15
Pedagogy:	Lectures / Seminars /videos/assignments/presentations /tutorials/ Quiz/ self-study/field trip/study tour or a combination of some of these can also be used.	
Texts:	1. Ameer Mubaslat, Introduction to waste management, 1st Ed. The Hashemite Kingdom of Jordan, Jordan, 2021. 2. Ramesha Chandrappa, Diganta Bhusan Das, Solid Waste Management Principles and Practice, 2nd Ed. Springer Nature, Switzerland, 2024.	
References/ Readings:	1. Manual on Municipal Solid Waste Management Part-II, Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development, Government of India, New Delhi, 2016 2. Waste to Resources: A Waste Management Handbook, The Energy and Resources Institute, New Delhi, 2014 3. Solid Waste Management (Volume I), United Nations Environment Programme, Kenya, 2001. 4. Chinnappan Baskar, Seeram Ramakrishna, Shikha Baskar, Rashmi Sharma, Amutha Chinnappan, Rashmi	

	Sehrawat, Handbook of Solid Waste Management, Springer Singapore, 2022.
Web Resources:	1. United Nations Economic and Social Commission for Asia and the Pacific https://www.unescap.org/sites/default/files/CH08.pdf 2. Pawan Kumar Bharti, Bhupesh Sharma, R.K. Singh, A.K. Tyagi, Waste Generation and Management in Antarctica, Procedia Environmental Sciences, 2016, Volume 35, Pages 40-50, ISSN 1878-0296, https://doi.org/10.1016/j.proenv.2016.07.004. 3. Hamsa Iyer, Case Study of Mumbai: Decentralised Solid Waste Management, Procedia Environmental Sciences, 2016, Volume 35, Pages 101-109, ISSN 1878-0296, https://doi.org/10.1016/j.proenv.2016.07.054. 4. Smart City Indore https://www.smartcityindore.org/solid-waste/ 5. Waste management in Indore https://earth5r.org/sustainable-waste-management-in-indore-a-case-study/



Title of the Course	Fundamentals of Industrial Waste Management (Value added course)
Course Code	VAC-1502
Number of Credits	1.5 (T) + 0.5 (P)
Theory/Practical	Theory & Practical
Level	500
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	Yes
Course for advanced learners	Yes

Pre-requisites for the Course:	Should have studied Chemistry at UG level.
Course Objectives:	1. To understand the problems related to waste generation and identify methods and process for waste treatment 2. To provide exposure of govt facilities and industrial setup in the state for waste management
Course Outcomes:	Students will be able to
	CO 1. Explain different concepts of waste management
	CO 2. Analyze day-to-day human activities related to industrial waste generation
	CO 3. Identify sustainable methods for industrial waste disposal.
	CO 4. Demonstrate the processes involved in the industrial waste treatment

Content:		No of hours
Module 1:	Introduction to Waste Management, Principles and Procedures, Types of Waste	4
Module 2:	Waste from Industry: Metal Industry, Chemical Industry, Pharmaceutical Industry, Paper Industry, Plastic Industry, Glass Industry, Textile Industry, Wood Products Industry, Power Industry, Petroleum Industry, Mining Industry, Quarrying Industry, Oil and Gas Exploration Industry	15
Module 3:	Sustainability, Environmental impact, Case studies (Madurai, Keonjhar, Algeria, Miyun, Finland)	4
Module 4:	Field trip – Industry waste management facility in Goa (Chemical and other industries in Goa)	15
Pedagogy:	Lectures / Seminars /videos/assignments/presentations / Quiz/ self-study/field trip/study tour or a combination of some of these can also be used.	
Texts:	1. Ameer Mubaslat, Introduction to waste management, 1st Ed. The Hashemite Kingdom of Jordan, Jordan, 2021. 2. Ramesha Chandrappa, Diganta Bhusan Das, Solid Waste Management Principles and Practice, 2nd Ed. Springer Nature, Switzerland, 2024.	
References/ Readings:	1. Waste to Resources: A Waste Management Handbook, The Energy and Resources Institute, New Delhi, 2014 2. Tharakupeedikayil Abdul Majeed Sajeena and Nisha Pallath, Industrial Waste. Springer, Singapore. 2023	
Web Resources:	1. https://egyankosh.ac.in/bitstream/123456789/12908/1/Unit-8.pdf 2. https://unosd.un.org/sites/unosd.un.org/files/park_lifecycleapproachtomswtowardscirculareco.pdf 3. Linda Sefouhi, Lylia Bahmed; Risk Assessment of Industrial Waste: <i>Case of an Algerian Company. Case Studies in the Environment</i> 23 January 2023; 7 (1): 2001786. doi: https://doi.org/10.1525/cse.2023.2001786 4. https://www.internationaljournalsrsg.org/IJIE/2022/Volume9-Issue1/IJIE-V9I1P101.pdf 5. R.S. Krishna, J. Mishra, S. Meher, Shaswat K. Das, S.M. Mustakim, Saurabh K. Singh, Industrial solid waste management through sustainable green technology: Case study insights from steel and mining industry in Keonjhar, India, Materials Today: Proceedings, 2020, Volume 33, Part 8, Pages 5243-5249, ISSN 2214-7853, https://doi.org/10.1016/j.matpr.2020.02.949. 6. https://ipen.org/sites/default/files/documents/Case%20Study%20Report%20Miyun%202013r.pdf	

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| | <p>7. Hannu Nurmesniemi, Risto Pöykiö, Riitta Liisa Keiski, A case study of waste management at the Northern Finnish pulp and paper mill complex of Stora Enso Veitsiluoto Mills, Waste Management, 2007, Volume 27, Issue 12, Pages 1939-1948, ISSN 0956-053X, https://doi.org/10.1016/j.wasman.2006.07.017.</p> |
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