

Course Outline

Name of the Course: Waste and By-Product Utilization			Credit: 1+1
Name of the Content Developer/s: Dr. A.K.Jain, Dr. S. S. Sooch, Dr Mahesh Kumar, Dr Urmila Gupta, and Er. Ritesh Jain			
Name of the Reviewer: Dr. P.K Gupta			
Module No. and title	Lecture No.	Content	Author
I Introduction to by-products and waste generation in agricultural production and processing	1	By-products/waste, types of food by-product and waste, magnitude of by-products and waste in food production, magnitude of by-products and wastes in food processing	Dr.Mahesh Kumar Sharma
II Waste management concepts	2	Waste characteristics, waste management and effluent treatment	Dr. Mahesh Kumar Sharma
III Direct combustion of solid waste	3	Proximate and ultimate analysis of biomass, theory of combustion, direct combustion of biomass as fuel in furnaces, operating conditions affecting design of furnace.	Dr. Mahesh Kumar Sharma
	4	Bales, operation of baler, briquettes, advantages and uses of briquettes.	Dr. Mahesh Kumar Sharma
IV Thermo-chemical conversion of solid waste	5	Biomass gasification, gasification process mechanism, types of gasifier reactors, utilization of producer gas	Dr. A.K.Jain
V Bio-chemical conversion of	6	Biogas, biogas plants, classification of biogas plants, design of biogas plants, comparison among KVIC, Janta and Deenbandhu biogas plants, working of Deenbandhu	Dr. S. S. Sooch

solid waste		biogas plant.	
	7	Selection of proper size of biogas plant, utilization of biogas for cooking purpose.	Dr. S. S. Sooch
	8	Utilization of biogas for lighting purposes and engine operation	Dr. S. S. Sooch
VI Solid waste management	9	Methods of disposal solid waste, Vermin composting	Dr. U.Gupta
VII Effluent treatment and disposal	10	Parameters of effluent like temperature, pH, Oxygen demands (BOD,COD), fat oil and grease content, metal content, forms of phosphorous and sulphur in effluent	Er Ritesh Jain
	11	Treatment of effluent, steps for waste water treatment, sedimentation, coagulation, flocculation and floatation	Dr. Urmila Gupta
	12	Characteristics of food processing waste water, trickling filters, rotating biological contractors	Dr. Urmila Gupta
	13	Oxidation ditches, activated sludge process, lagoons	Dr. Urmila Gupta
	14	Filtration, slow sand filter, rapid sand filter, disinfection of water	Dr. Urmila Gupta
VIII Presence of typical chemicals	15	Microbiology of waste, bacteriological analysis of water, water borne diseases, insecticide, pesticide and fungicides residues	Dr. Urmila Gupta
	16	Management of Pesticide Residues, equipments for estimation of pesticide residue.	Dr. Mahesh Kumar Sharma