

KARABÜK ÜNİVERSİTESİ
LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

DEPARTMENT OF WASTE MANAGEMENT
Content of Master's Degree Programme in Waste Management with Thesis

COURSE CODE	COURSE NAME AND CONTENTS	T	A	C	ECTS
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SKM705	Construction and Operation of Sanitary Landfills	3	0	3	8
Purpose and Content	<p>Information will be given about the planning and operation of the landfills where municipal and industrial solid wastes are stored. How the calculations necessary for the general design of these landfills and for the sizing of the systems in these sites were made will be shown.</p> <p>In this course, the following topics will be covered: collecting solid wastes and transporting them to landfills; techniques used to make the bottom of the landfill impermeable; leachate drainage systems; compacting the waste and laying the top cover; storage gas generation and gas collection systems; site selection; planning, design, operating and monitoring of the landfill; closure of the landfill; maintenance and final use after shutdown.</p>				

SKM707	Anaerobic Treatment	3	0	3	8
Purpose and Content	<p>Teaching to students anaerobic treatment systems and applications. General view to anaerobic treatment, General rules of anaerobic treatment, Advantages and disadvantages of anaerobic processes, Microbial activity, Microbial growth kinetic, Anaerobic treatment stages: Hydrolysis, Organic acid production, Methane production. Biochemistry of anaerobic treatment, Energy utilize pathways, Operational parameters of anaerobic treatment, Biogas production and gas contents, Classification of anaerobic reactors, Anaerobic treatment of domestic wastewaters.</p>				

SKM708	Landfill Leachate Generation, Control and Treatment	3	0	3	8
Purpose and Content	<p>To introduce formation mechanisms for landfill leachate and models used for the estimation of leachate quality, To introduce treatment technologies in order to design and define the appropriate controlling strategies for different kinds of landfill leachate. Operational principles of sanitary landfills; Formation mechanisms of landfill leachate; Models for landfill leachate formation; Leachate quality and toxicity; Leachate attenuation; Leachate containment; Processes applied for landfill leachate controlling; Selection of an effective leachate treatment train; Regulations and their impacts.</p>				

SKM723	Use of advanced chemical methods in wastewater treatment	3	0	3	8
Purpose and Content	<p>The objective of this course, to improve treated wastewater quality which can not be realized by using conventional methods, is to teach advanced chemical treatment techniques and applications for the reusable of domestic wastewaters, for the dischargable characteristics of leachates and for the reducing of industrial wastewater toxicity.</p> <p>Wastewater types and their characteristics , Hazardous Substances and Wastes , Physico-Chemical Treatment Methods , Advanced Oxidation Processes.</p>				

SKM734	Utilisation of special wastes	3	0	3	8
Purpose and Content	<p>The aim of the course is to give knowledge about special wastes. To give knowledge about methods for utilisation of special wastes. Course topics: utilisation of waste electronics, utilisation of waste tires, utilisation of waste batteries, utilisation of construction and demolition wastes, utilisation of used oils.</p>				



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SKM735	Gasification of waste materials	3	0	3	8
Purpose and Content	The aim of the course is to give knowledge about gasification of waste materials. To give knowledge about techniques for gasification of waste materials. Course topics: fundamentals of gasification and pyrolysis, by-products of gasification and pyrolysis, plasma gasification technology, hydrothermal process, process conditions, biomass and municipal waste processes, nonrecycled plastic pyrolysis processes.				
SKM 701	Solid Waste Treatment Technologies	3	0	3	8
Purpose and Content	The objective of the course is to teach solid waste characteristics that greatly affect the treatment method selection and available solid waste treatment technologies, in order to provide the necessary basic technical knowledge to determine the most efficient and economic, also the most environmentally-friendly, disposal strategy. Firstly, the properties of solid wastes, their classifications in the legislation and which characteristics should be taken into consideration while planning for the solid waste treatment method are described. In the following weeks, available methods for solid waste treatment (mechanical processes, thermal treatment, biological degradation and land applications, disposal in landfill sites, solidification of hazardous wastes) are explained. The main advantages and disadvantages of each method are studied.				
SKM 738	Bioproduct development with Microwave Assisted Processes	3	0	3	8
Purpose and Content	This lesson discusses some of the challenges that MW irradiation faces, including the poor dielectric properties of some substrates and issues related to its large-scale application in pyrolysis, hydrothermal conversion and catalytic routes to biofuels, materials and platform chemicals. Waste biomass may well be the benchmark feedstock for the development of a circular bioeconomic approach. In this course, hydrothermal liquefaction and chemical production by catalytic transformations using heat generated by microwave biomass interaction; also energy production by pyrolysis and hydrothermal transformations; and also the activation of biomass wastes and the production of activated carbon will be explained.				
SKM731	Environmental Toxicology	3	0	3	8
Purpose and Content	Objectives of the Course: Definition and classification of toxicology, detection methods of harmful chemicals important for human health and environment in the environment, the importance of pollution caused by these chemicals for human health, internationally valid test methods and professional terms used in these tests etc. To increase the knowledge and skills of students on issues. Introduction to toxicology, Classification of chemicals, methods of detecting chemicals in soil and water, chemicals on the environment				
SKM717	Recycling Practices in Industries	3	0	3	8
Purpose and Content	The objective of the course are to enable the students to Understand industrial pollution, understand the industrial pollution resources and types, be able to develop appropriate treatment methods for industrial pollution, be able to develop industrial pollution control strategies and industrial waste management systems. The content of the course : The definition and concept of collective management of industrial systems, industrial pollution and their properties, classification of industries based on pollution, waste research, industrial pollution control, discharge standards, pollution in textiles, metal, leather, milk, paper, and meat production industries, hazardous wastes in industrial systems, evaluation of the waste management system in industries.				
SKM736	Phytoremediation	3	0	3	8



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Purpose and Content	Phytoremediation of soils contaminated with heavy metals
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SKM729	Environmental Applications of Nanomaterials	3	0	3	8
Purpose and Content	<p>Objective of the course on environmental applications of nanomaterials Course Purpose: Definition of nano materials, concept of nano dimension, basic principles of nano materials and applications, importance and application areas of nanotubes, superior properties of materials gained by nano dimensions, synthesis and production methods of nano materials, tools to examine nano material properties. information is given. The future and goals of nanoapplications are explained.</p> <p>Course Content Defining nanomaterials, learning natural nanomaterials and the historical development of nano applications; To learn nanosizing, basic research topics and application areas, to understand the interdisciplinary science feature; Learning liquid, dry and vapor synthesis methods of nanoparticles, sol gel, chemical precipitation, dry grinding, PVD, CVD methods; Getting to know carbon nanotubes, learning their production methods, properties and application areas in electronics and medicine; Carbon Nanomaterials - Learning the structure and synthesis of graphene, fullerenes and nanotubes</p>				

SKM719	Green Chemistry	3	0	3	8
Purpose and Content	<p>The objective of the course is to use the basic concepts of green chemistry in environmental studies, to offer appropriate solutions for environmental problems and the analysis of environmental samples. To create the necessary green chemistry knowledge in the environmental engineering field.</p> <p>Course Content: Defining the terms in green chemistry to be used in the environmental field, to satisfy the necessary green chemistry knowledge base for the analysis of environmental samples, types of analysis methods suitable for green chemistry and selecting the proper one, green chemistry and green engineering as tools to improve sustainability in order to evaluate their influences on the social and economic aspects of sustainability</p>				

