(Table 5.2) Course unit description

Study program : Chemistry
Type and level of studies: Master academic studies
Course unit: Hazardous substances and hazardous waste management
Teacher in charge : Matović D. Zoran
Language of instruction: English
ECTS: 6
Prerequisites: Passed exams: Inorganic industrial pollutants. Organic industrial pollutants
Semester: *Summer Semester*
Course unit objective The aim of this course is to educate students in the field of hazardous materials and hazardous waste management to after completion of the study could become actively involved in the processes of management of hazardous substances and hazardous waste by international and legislation of the Republic of Serbia, which should provide theoretical and practical knowledge for their independent work in the field of hazardous waste management.
Learning outcomes of Course unit Knowledge of basic classes and categories of hazardous materials and hazardous waste. The ability of the student to be successful to recognize where and when the generation of hazardous waste, perform the characterization and categorization and on the basis of these data suggest the optimal environmentally sustainable. Also, students will acquire the basic guidelines in the field of hazardous waste by international and republican legislation (Basel convention, Ban amendment, the Law on Environmental Protection and its bylaws).
Course unit contents *Theoretical classes* Within this course you will learn to: The processes and waste materials: the generation of hazardous waste; Sources of hazardous waste; Characterization and categorization of waste: Categories and methods of classification; The categorization of hazardous waste by source; Hazardous wastes from non-specific sources; Hazardous waste from specific sources; Commercial chemical products; Hazardous constituents; Authorized laboratory for characterization; Cadastral Records and Identification of Hazardous Waste; The properties and classification of hazardous waste; Data collection; Technical and legal framework of management: role of the state; The role of industrial generators of hazardous waste; The role of transporters; The role of specialized organizations for waste disposal; The role of the public; Different categories of solid waste, industrial solid, industrial and hazardous waste: types and characteristics of hazardous waste that can be found in municipal solid waste; A typical hazardous waste from households; A typical hazardous waste from the commercial sector; The importance of hazardous waste in municipal solid waste; Chemicals, hazardous materials and hazardous waste management: Hazardous substances and their classification; The assessment of health risks from hazardous substances and hazardous waste; Persistent organic pollutants that can be found in hazardous waste; Polychlorinated biphenyls (PCBs); Dioxins and furans; Pesticides; Management of hazardous waste contained in municipal solid waste; Methods of treatment according to the type of waste; Processing Options: Waste from the chemical industry; Reuse of chemical waste in the viscose industry; Re-use of oil; Storage: Storage on the spot; collection of hazardous waste; transfer station; Temporary disposal; Final disposal: Methods of disposal of hazardous waste; Hazardous waste landfill (determining location; construction of the landfill; substrates for landfill; system for collecting leachate; control of gas from the landfill, closure and coverage (reclamation) of hazardous waste landfill; monitoring the closed landfill for hazardous waste); Programs minimization and management of hazardous wastes; The concept of cleaner products and cleaner technologies; Waste management in the management of environmental protection. Theoretical teaching is much improved by using modern methods such as Turning Technologies LLC (Turning Point) knowledge quizzes and interactive whiteboard. The main role lies in better communication with students, as well as checking the acquired knowledge during lectures and also checking the ability of teachers to transmit knowledge to students. The said equipment was purchased thanks to the TEMPUS project: "Modernisation of Post Graduate Studies in Chemistry and Chemistry Related Programmes, 511044-TEMPUS-1-2010-1-UK-TEMPUS-JPCR". *Practical classes* In the framework of practical training students are able to learn and adopt practical knowledge of the following three types of exercises: Analysis of the application of national and international legislation in the field of hazardous waste management. Analysis of case studies in the field of karkaterizacije and categorization of waste.

Practical examples from the field of Management of hazardous, industrial and other waste (visits to industrial, institutes and other facilities).

Literature

1. Dr Borislav Jakšić, Dr Marina Ilić " Hazardous waste management", Banja Luka 2000.

Number of active teaching hours				**Other classes /**
Lectures: 2	Practice: 2	Other forms of classes:/	Independent work: /	

Teaching methods All aspects of modern teaching (graphics, audio and video) in modern auditoriums with video beam, projector and blackboard. Methods of Exercise: Practical classes will run visit organizations working with aspect to the shooting situation, the analysis and suggestions for the optimal solution for management of hazardous waste. Seminar papers are based on lectures and exercises.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
Student's activity during lectures	10	oral examination	15
practical classes/tests	20	written examination	15
Seminars/homework	30	.....	
Colloquiums	10		
Other	/		

Grading system

Grade	**No. of points**	**Description**
10	91-100	Excellent
9	81-90	Exceptionally good
8	71-80	Very good
7	61-70	Good
6	51-60	Passing
5	<51	Failing