Subject Title: Polymer and Bituminous Materials

Course Basic Information	
Academic Unit:	**Faculty of Civil Engineering**
Course title:	**Polymer and Bituminous Materials**
Level:	**Master/Msc/**
Course Status:	**Elective/E/**
Year of Study:	**I (year)– semester I(first)**
Number of Classes per Week:	**1+1**
ECTS Credits:	**3**
Time /Location:	**According to time table**
Teacher:	**Prof. Dr. Naser Kabashi**
Contact Details:	e-mail: naser.kabashi@uni-pr.edu
Course Description:	Polymer and Bituminous Materials include: General knowledge of Polymer Materials. Types, characteristics and properties of Polymers and apply constructive elements. Concrete Polymers, properties and compare with common plain concrete. Bituminous Materials, properties, examinations and using in Asphalt Concrete. Hydroinsulations materials and applications in different construction positions
Course Goals:	Goals of the course-General data for the basic knowledge of Polymer and Bituminous Materials. Properties and applications such building Materials and applications in elements of structures.
Expected Learning Outcomes:	After the complete the Course, the student will be able to : • To know the properties of polymer materials and different types of polymers with specific properties • To know and to understand the properties of the Bituminous Materials and types of the Bituminous Materials. • To use the polymer materials in different positions , elements of structures , light tensile structures, and eventually the combinations. • To know to use the bituminous materials such row material for asphalt concrete and hidroinsulations materials

Student Workload (should be in compliance with student's Learnign Outcomes)			
Activity	**Hours**	**Day/ Week**	**Total**
Lectures	2	15	30
Theory/ Lab Work/Exercises	1	15	15
Practical Work	4	1	4
Preparations for intermediary test	1	4	4
Consultations with the teacher	1	5	5
Field Work	2	1	2
Test, seminar paper	1	4	4
Homework	1	4	4

Self-study (library or home)	1	2	2
Preparation for final exam	1	2	2
Assessment time (test, quiz, final exam)	1	1	1
Projects, presentations, etc.	1	2	2
Total			**75**
Teaching Methods:	- *Lectures, presentation and practical applications in improvement the properties of the concrete using in Constructions; Industrial floors and in composite materials.* - *Applications the Bituminous materials through the* - *laboratory works.* - *Numerical examples* - *Seminars and practical examples* - *Interactive discussions during the lectures and exercises* - *Work in groups.*		
Assessment Methods:	*During the semester will organized the two tests with following evaluations;* - *First test : 40 % (include 50 % of teaching materials)* - *Second test : 40 % (include 50 % of teaching materials)* - *Seminar Work 20 %* *Average of the two tests will be present in final grade.* *Otherwise the Exam will be organized at the end of the lectures:* - *Written form 50%* - *Oral Part 50%*		
Primary Literature:	*N.Kabashi- Materialet polimere dhe bituminoze-ligj. te autorizuara*		
Additional Literature:	• *Sergiy Minko: Responsive polymer materials* • *Berhard Wunderlich Thermal Analyses of Polymeric Materials* • *Neil Jakson and Ravindra Dhir: Civil engineering materials* • *Petar Subotic -.; Prirucnik za asfalt* • *Z.Simunic-Polimeri u Graditeljstu*		

Designed teaching plan	
Week	**Title of the Lecture**
Week 1:	***Introduction*** - *Polymer Materials,* - *Types and chemical concept* - *Production and general characteristics*
Week 2:	***Technology of Polymer Materials*** - *Technology and methods of production the Polymer Materials,* - *Types of the Polymers for reinforced and used in different base materials.* - *Copolymerization such process*
***Week 3*:**	***Physical- mechanical properties of Polymer Materials***

	- *Evaluations of the Physical properties* - *Evaluations of the mechanical properties* - *Effect of the Polymer material properties and applications of materials.*
Week 4:	***Structures of Plastic and composites, properties and using in different positions in civil engineering structures*** - *Polymers such composite materials* - *Applications in structures and structural elements*
Week 5:	***Concrete polymers, general characteristics*** - *Improvement the common plain concrete* - *Using the polymers in concrete* - *Compare the properties of common and polymer concrete*
***Week 6*:**	***Industrial floors, characteristics and using the polymers for industrial floors*** - *Types of Industrial floors* - *Methodology of apply in industrial floors* - *Joints in industrial floors.*
Week 7:	***Laboratory works*** - *Necessary examinations in industrial floors* - *Pull of Test*
Week 8:	***Bituminous Materials , types, characteristics and using*** - *Properties of bituminous Materials* - *Examinations and methods of evaluations the parameters.* - *Applications the bituminous Materials in Infrastructures*
Week 9:	***Bitumen, characteristics and properties*** - *Physical properties of bituminous* - *Determainations and Evaluations in laboratory of properties*
Week 10:	***Aggregate, properties and using in asphalt concrete*** - *Examinations of the properties of aggregate* - *Requested conditions according the EN* - *Design of the granulometry curve of mixture*
***Week 11*:**	***Design the Hot –Mix asphalt Concrete*** - *Design steps of the Mixture* - *Preparing the asphalt samples based on the design steps.*
***Week 12*:**	***Evaluations of the Hot Mix Design*** - *examinations of the properties in laboratory* - *Stability* - *Flow* - *Density of the asphalt mixture* - *Percent of air voids in asphalt mixture*
***Week 13*:**	***Laboratory work*** - *process of extraction* - *Content of bitumen* - *evaluations of the percent of bitumen in mixture* - *Evaluations of the granulometry* - *Content of the filler in mixture*
***Week 14*:**	***Hydroinsulations bituminous Materials*** - *types of hydroinsulations materials*

	- *using the hydroinsulations materials in different positions; roofs; reservoirs; bedrums, ect.*
***Week 15*:**	***Modified Bituminous Materials*** - *Concept of Modifications* - *types of the modified bituminous and applications in road infrastructure*

Academic Policies and Code of Conduct
The teacher assigns the criteria for regular attendance in classes and rules of conduct, to maintain the peace in teaching, disconnected mobile phones, entrance in room with time, etc.)

Note |The works in Laboratory and preparing the seminar is obligatory for pass the exam