Course title: Polymer materials and applications in environmental engineering

Course Basic Informations	
Academic Unit:	Faculty of Civil Engineering
Course title:	Polymer materials and applications in Environmental Engineering
Level:	Bachelor
Course Status:	Elective
Year of Study:	III (Third semester)
Number of Classes per Week:	2+1
ECTS Credits:	3
Time /Location:	According to timetable
Teacher:	Prof. Ass. Milot Muhaxheri
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Course Descriptions	Course: Basic knowledge about Polymer Materials. Technological processes and manufacturing. Challenges and replace the conventional materials with Polymer Materials. Behaviour of polymer Materials under various loadings. Application of polymer materials in Civil Engineering field. FRP and applications in strengthening and reinforcement of the structural elements. Fiber application as a micro reinforcement. Industrial floors. Recycling the Polymer Materials.
Course Goals:	This course aims to teach students with the main properties of Polymer Materials, examinations and applications in Civil Engineering Fields, including the Environmental Engineering
Expected Learning Outcomes:	At the end of the course the student will be able to: 1. to understand the polymer materials and their applications in structural elements 2. to understand and examine the properties of materials according the EN. 3. to apply the knowledge in development of new materials focused in composite materials and improvement the properties. 4. to use the materials in adequately in structures and understand the behavior of the these materials under different environmental conditions
Student Workload (should be in compliance with student's Learning Outcomes)	

Activity	Hours	Days/week	Total
Lectures	2	15	30
Exercises/ Lab Work	1	15	15
Practical Work	8	2	16
Contact Hours with Teacher /Consultations during Office Hours	2	4	8
Field practical Work	4	2	8
Homework	2	2	4
Self-study Time (in the Library or at Home)	2	2	4
Final Exam Preparation	1	15	15
Evaluations (Tests, Quiz, Final exam)	2	5	10
Projects, Presentations, etc.	2	2	4
Total			**117**

Teaching Methods:	- Lectures and presentations using the practical examples focused on Polymer Materials - professional practice - seminars and practical examples. - Interactivity during the lectures and exercises - work in group.
Assessment Methods:	The final exam will be organized: - Written part 50% - Oral part 50% - Oral part includes the presentation of group works
Primary Literature:	1. Materialet Polimere dhe Aplikimi ne Inxhiniërinë e Ambientit, Naser Kabashi (ligjerata) Teknologjia e Materialeve te Ndërtimit, Fisnik Kadiu
Additional Literature:	1. Inroduction to Polymer Science and Technology, Mustafa Akay, 2012 2. Polymer Science and Technology, Robert O. Ebewele, 2000. 3. Manufacturing Processes and Materials: Exercises, Dr.Miltiadis A.Boboulos, 2010

Designed teaching plan	
Week	**Title of the Lecture**
Week 1:	Polymer materials; Concept and structure
Week 2:	Types of the Polymer Materials - Homogenous Polymers - Heterogenous Polymers - Molecular mass
Week 3:	Technologic process and manufacturing - Steps of processing

	- Raw materials - Binder materials - Filing materials
Week 4:	Copolymerization and achievement the properties
Week 5:	Replacements the conventional materials with polymer materials in different structural positions
Week 6:	Behaviour the Polymer Materials under various loadings - Chart σ-ε - Effect of environmental aggressive conditions on behavior of the Polymers
Week 7:	FRP Materials-concept and types - Productions and types - Fibres and their application in strengthening the structural elements of concrete
Week 8:	FRP Materials and applications - Strengthening and confinement for concrete beam - Strengthening and confinement for concrete column
Week 9:	FRP Materials and repairing the structures - Repairing the structures under aggressive environmental conditions - Behaviour the FRP Materials subjected to aggressive environmental conditions
Week 10:	Industrial floors - Application of Polymer Materials for industrial floors - Epoxy Floors
Week 11:	Recycling the Polymer Materials - Recycling types - Properties of recycling materials
Week 12:	Usage of the Polymer Materials in corrugated sewage pipes - Types of Corrugated pipes and properties - Examinations of properties the Corrugated pipes
Week 13:	Usage of the Polymer Materials in producing the mortars - Mortars for repairing - Mortars with special requirements
Week 14:	Polymer products - Woven fabrics - Geotextile - Polymer laminates
Week 15:	Repairing the elements and structures - Practical case studies
Academic Policies and Code of Conduct	
Regular attendance of lectures and exercises The lesson starts and ends on time. The space used during the lessons should be cleaned and maintained at the end of the lesson. Independent work in laboratory exercises, or in small groups Behavior and rules of conduct according to the Code of Ethics	