LAND RECLAMATION

Course Code/Course ID : 06.4-WI-ISP-RekTPoprz05p- 16

Type of course: compulsory

Teaching language: English

Director of studies: dr hab.inż. Andrzej Greinert, prof.UZ

Name of lecturer: IEE teachers

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Points ECTS
Full-time studies					6
Lecture	30	2		Grade with notes	
Project	30	2		Grade with notes	

THE AIM OF THE LECTURE

The student becomes familiar with: the legal procedure for the recognition of degraded areas and its consequences; recognize different types of land degradation including multifactorial events; technologies and techniques used in the reclamation procedures; the methods of soils control.

ENTRY REQUIREMENTS

Formal: positive results from the units: Soil science, Chemistry, Earth sciences, Basics of the environment protection.

Informal: Ability to draw and design including the material calculation at the engineering level.

SCOPE OF COURSE TOPICS

The program of lectures: Concepts and legal standards of environment reclamation. Anthropogenic transformation of soils. Assessment of environmental degradation. Land degradation indicators. Selecting the direction of reclamation. The planning of land rehabilitation – preparation works, the stages of reclamation. Processes, techniques and reclamation works. Reclamation method using pioneer vegetation. Model of PAS (Polish Academy of Sciences). Reclamation of post-mining areas (relating to opencast coal mining, underground mining, extraction and exploitation of natural aggregates, opencast exploitation of other raw materials). Rehabilitation of quarries. Biological reclamation of the combustion wastes landfill sites. Reclamation of municipal landfills. Reclamation of roadsides. The possibility of chemically degraded areas reclamation – in site and ex site treatment techniques. The management with soil material. Forests in reclamation systems. Rehabilitation of urban areas. Prospects for the cities development as a measure of rehabilitation needs.

Program of projects: the preparatory studies; cartographical and field works during the transformed land reclamation design preparation. Reclamation draft for the selected urban or industrial area. The project should include: situation assessment, direction and objectives of reclamation, the assumptions for the land development, the scope and sequence of works, description of the earthworks including slopes formation and erosion control techniques, the selection of plant species and plants introduction techniques, bill of materials and workmanship, simplified cost calculation.

TEACHING METHODS

Giving methods: lecture information – problem; analysis of the situation; debate.
Searching methods: problematic: exchange of ideas in the assessment of the causes and effects of the land degradation phenomena; situational: analyzing by the student group the actual situation of real site situations; practice: field exercises.

LEARNING OUTCOMES

Symbol	Learning outcomes after completion of the course. Student:	The reference to the effects of education in the field of technical sciences
Knowledge		
IS2A_W00	define the concept of degradation, devastation, reclamation (rehabilitation) and management of urban and industrial areas	T2A_W02; T2A_W08
IS2A_W00	describes the causes and consequences of land degradation	T2A_W02; T2A_W03 InzA_WO3
IS2A_W00	explains the interactions between human activities and the urban and industrial areas development	T2A_W02; T2A_W03
IS2A_W00	assess trends and estimates remediation techniques implementation possibilities	T2A_W03 InzA_W02
Skills		
IS2A_U00	develops plans for restoration of degraded land	T2A_U10; T2A_U15; T2A_U18; InzA_U08
IS2A_U00	designs rehabilitation course	T2A_U19; InzA_U05; InzA_U08
IS2A_U00	selects and proposes techniques of contaminated land detoxification	T2A_U15; T2A_U18; InzA_U07
IS2A_U00	reports and presents the results of research	T2A_U03; T2A_U04
Social competence		
IS2A_K00	works in the local community for the improvement of urban and industrial areas	T2A_K02; T2A_K03; InzA_K01
IS2A_K00	organizes teams of experts for the protection and rehabilitation of urban and industrial areas	T2A_K02; T2A_K03; InzA_K01
IS2A_K00	Serves as a consultant in the field of protection and rehabilitation of urban and industrial areas	T2A_K02; T2A_K03; InzA_K01

ASSESSMENT CRITERIA

The basis for passing the project classes is the attendance at all classes, systematic preparation for each class; preparation and submission on time and passing the project.
Examination: the condition to take the exam is to obtain a positive grade from the laboratory exercises - the exam is in writing (2 problem questions, 2 accounting tasks).
Grading scale: 0 ÷ 50% - insufficient, 51 ÷ 60% - satisfactory, 61 ÷ 70% - satisfactory plus, 71 ÷ 80% - good, 81 ÷ 90% - good plus, 91 ÷ 100% - very good. The basis for determining the cumulative rating is the weighted average obtained by adding: 0.7 lecture scores, 0.3 grades from laboratory exercises. The weighted average is rounded to two decimal places. The total rating is based on the weighted average according to the rule: below 3.24 - sufficient, from 3.25 to 3.74 - satisfactory plus, from 3.75 to 4.24 - good, from 4.25 to 4.74 - a good plus, from 4.75 - very good.
The total mark for this course is the weighted average obtained by adding: 0.6 lecture grade and 0.4 evaluation from project classes.

SELF STUDENT'S WORK

Independent student work (set up to: classes, exams, reading literature, dissertations, projects, presentations, reports, speeches): 80 h;

Contact hours (classes, tutorials, exams, etc.): 80 h.

RECOMMENDED READING

1. Plyusin I., 2008. Reclamation Soil Science. Biotech Books.
2. Moore H.M., Fox H.R., Elliott S., 2003. Land Reclamation 7th Intl. Taylor & Francis.
3. Bradshaw A.D., Chadwick M.J., 1980. The Restoration of Land. The Ecology: Reclamation of Derelict and Degraded Land. University of California Press.
4. Schaller F., 2000. Reclamation of Drastically Disturbed Lands (Agronomy, No. 41). American Society of Agronomy-Crop Science Society of America-Soil Science Society of America.

OPTIONAL READING

1. Kim H. Tan, 2009. Environmental Soil Science, Third Edition. Books in Soils, Plants, and the Environment.
2. Sopper W., Seaker E.M., Bastian R.K., 1982. Land Reclamation and Biomass Production With Municipal Wastewater and Sludge. Pennsylvania State Univ. Pr.
3. Lyle E.S., 1987. Surface Mine Reclamation Manual. Appleton & Lange.
4. Darmer G., Dietrich N.L., 1992. Landscape and Surface Mining: Ecological Guidelines for Reclamation. Van Nostrand Reinhold.

Scientifical journals:

5. Soil Science Annual – The Polish Society of Soil Science
6. Polish Journal of Soil Science – Institute of Agrophysics Polish Academy of Sciences
7. Journal of Plant Nutrition and Soil Science – Wiley-Vch Verlag GmbH & Co.
8. Ecological Engineering – Elsevier
9. Journal of Environmental Chemical Engineering – Elsevier

REMARKS