

## 6.5 CE0650 – Construction Equipment & Site Management

### (1) GENERAL

<b>SCHOOL</b>	ENGINEERING SCHOOL		
<b>ACADEMIC UNIT</b>	CIVIL ENGINEERING DEPARTMENT		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	CE0650	<b>SEMESTER</b>	6
<b>COURSE TITLE</b>	Construction Equipment & Site Management		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
	3	3	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialization Course		
<b>PREREQUISITE COURSES:</b>	-- English level B2 or higher is required for Erasmus incoming students		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek (English/Erasmus)		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uniwa.gr/courses/PEY121/">https://eclass.uniwa.gr/courses/PEY121/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b> The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. Consult Appendix A</p> <ul style="list-style-type: none"> <li>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul>
<p>Upon successful completion of the course the student</p> <p>will have understood the basic principles governing the operational efficiency analysis of key construction equipment/machinery (CE/M) with regards to their productivity - either by estimation (pre-work) or by measurements (post-work).</p> <p>will be able to apply operational efficiency analysis to the estimation of CE/M productivity both in solitary operation activity or within a combined operation set-up (multi CE/M operation activity).</p>

will have understood the factors that affect the operation of a construction site

will be able to apply principles and good practices of designing, organizing, operating and managing a construction site.

will be able to evaluate the performance of an on-going construction site and review the potential of marginal improvement; accordingly he will propose appropriate/necessary improvements

### General Competences

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?;*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*

*Adapting to new situations*

*Decision-making*

*Working independently*

*Team work*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Production of new research ideas*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*

*Adapting to new situations*

*Decision-making*

*Working independently*

*Team work*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Production of new research ideas*

The course aims that the student acquires - practice the following general skills:

- Search for, analysis of, and synthesis of data and information, implementing appropriate technologies
- Independent work - Team work - Working in an international / interdisciplinary environment
- Decision-taking
- Proact free, creative and inductive thinking
- Project planning and management

### (3) SYLLABUS

#### Theoretical Part of the Course

Basic concepts. Performance, machine productivity, operational efficiency analysis, costs. Earthmoving activities: relaxation, excavation, loading and transport, laying/paving, compaction.

Operation - performance of Construction Equipment and Machinery (CE/M): Basic machine work cycle, machine characteristics, Work Breakdown Structure (WBS) analysis, principles and methodologies of operational efficiency analysis and productivity estimation.

Soils and their characteristics related to earthmoving activities

Categories of machinery & equipment for technical and/or construction works

Excavating machines, transport machines, loading, laying and compaction machines: Productivity analysis in independent and combined operation cycles; selection of the machine type depending on the work/project parameters.

Machinery for production of aggregates, lifting/hoisting machines, equipment and installations for construction sites, electronic equipment, telecommunications equipment and security equipment, monitoring and information management.

Exercise - Educational Project

Analysis /study of the operation of various CE/M either in solitary or combined operation conditions within a real construction site (using electronic-audiovisual media, internet). The subject matter is designed to implement a direct application of theoretical knowledge acquired during the semester and develops the initiative, critical thinking and team spirit of students.

### (4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face in-class teaching. When needed, distance teaching (synchronous/asynchronous)															
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Use of I.C.T. in Teaching and Student Communication															
<p style="text-align: center;"><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th> <th style="text-align: center;">Semester workload</th> </tr> </thead> <tbody> <tr> <td>In Class (/Distance) Teaching</td> <td style="text-align: center;">39</td> </tr> <tr> <td>Literature Study</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Exercises / Paradigms</td> <td style="text-align: center;">16</td> </tr> <tr> <td>Project assignment / Essay</td> <td style="text-align: center;">15</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>Course total</td> <td style="text-align: center;"><b>90</b></td> </tr> </tbody> </table>		Activity	Semester workload	In Class (/Distance) Teaching	39	Literature Study	20	Exercises / Paradigms	16	Project assignment / Essay	15			Course total	<b>90</b>
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<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Language of evaluation: Greek (English/Erasmus)</p> <p>Written examination, 2,5-hours Problem solving, Multiple choice test, Questions and Answers, Written Essay / Project</p> <p>The evaluation criteria are announced to the students well before the examination; weights per subject /exercise are explicitly indicated.</p> <p>The examination results (including total / partial grading) are announced on the web. Students may require to have access to their tests, they may ask for clarifications on mistakes, grading etc.</p>															

## (5) ATTACHED BIBLIOGRAPHY

<p><u>Greek Bibliography:</u></p> <ol style="list-style-type: none"> <li>1. ΠΑΝΤΟΥΒΑΚΗΣ, ΠΑΡΙΣ ΜΙΧ., ΠΑΝΑΣ, ΑΝΤΩΝΗΣ Θ., ΣΤΟΙΧΕΙΑ ΔΟΜΙΚΩΝ ΜΗΧΑΝΩΝ ΚΑΙ ΑΣΦΑΛΕΙΑΣ ΕΡΓΩΝ, ISBN: 978-960-645-003-7, ΕΚΔΟΣΕΙΣ ΚΛΕΙΔΑΡΙΘΜΟΣ ΕΠΕ, 1η/2019, Κωδικός Βιβλίου στον Εύδοξο: 86198208</li> <li>2. Πετροτσάτου Κλαίρη, Μαρινέλλη Μαρίνα, Δομικές μηχανές, λειτουργική ανάλυση και κοστολόγηση έργων πολιτικού μηχανικού, 2η έκδ./2018, ISBN: 978-960-586-253-4, ΕΚΔΟΣΕΙΣ ΚΡΙΤΙΚΗ ΑΕ, 2018, Κωδικός Βιβλίου στον Εύδοξο: 77109712</li> <li>3. Εφραιμίδης Χαράλαμπος, Δομικές Μηχανές, 1η έκδ./2002, ISBN: 978-960-266-160-4, Σ.ΑΘΑΝΑΣΟΠΟΥΛΟΣ &amp; ΣΙΑ Ι.Κ.Ε., 2002, Κωδικός Βιβλίου στον Εύδοξο: 45269</li> </ol> <p><u>Foreign Bibliography:</u></p> <ol style="list-style-type: none"> <li>1. "CATERPILLAR Performance Handbook" Caterpillar Inc., Peoria, Illinois, USA (electronic version)</li> <li>2. Christianson, L. L., Rohrbach, Roger P. "Design in agricultural engineering" St. Joseph, Mich: American Society of Agricultural Engineers, c1986, ISBN: 0916150801 (UniWA Library)</li> <li>3. Department of the Army "Earth Moving Operations" Field Manual 5-434, Washington DC, 15 June 2000 (electronic version)</li> <li>4. Gransberg D., Popescu C.M., Ryan R. "Construction Equipment Management for Engineers, Estimators, and Owners" (Civil and Environmental Engineering) by ISBN 0-8493-4037-3, CRC Press, 2006</li> <li>5. Komatsu "Specifications &amp; Application Handbook" Edition 30, 2009 KOMATSU, Japan (electronic version)</li> </ol>
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6. Macmillan, D., Harrington, R., Jones, R. "John Deere tractors and equipment" St. Joseph, Mich., USA: American Society of Agricultural Engineers , c1988-c1991, ISBN: 091615095X & 0929355199 (UniWA Library)
7. Nichols, H.L., David A. Day, D.A.: "Moving the Earth: The Workbook of Excavation", ISBN: 0070464847, McGraw-Hill Professional 1998 (UniWA Library)
8. Peurifoy R. L., Ledbetter, W.B. and Schexnayder C.J. "Construction Planning, Equipment and Methods", ISBN 0-07-114600-8, McGraw-Hill International Editions 1970 (UniWA Library)