GDANSK UNIVERSITY OF TECHNOLOGY
FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING

Full-time MSc Studies in Civil Engineering

Study programme syllabus

Academic year 2015/2016
### Full-time MSc Studies in Civil Engineering

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Total number of hours/ECTS: 210 135 15 60 30 240 45 60 60 30 30 45 0 15 0 75 30

Total number of hours: 420 435 135

* The subject includes team project
**Field of study:** Civil Engineering  
**Responsible Person:** prof. dr hab. inż. Eligiusz Mieloszyk  
**Postgraduate studies (MSc – course)**  
**Department of Differential Equations and Applications of Mathematics**  
**Year of study:** I / **Semester:** 1  
**Language:** English  

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**Topics:**


**Objectives:**
- knowledge of formulating standard initial-value problem,
- boundary value problem,
- mastering fundamentals of tensor calculus.

**Recommended literature:**
2. Evans L.C.: *Partial Differential Equations* AMS.
6. Mieloszyk E.: *Nieklasyczny rachunek operatorów w zastosowaniu do uogólnionych układów dynamicznych*. Wyd. PAN.
Field of study: Civil Engineering  

Responsible Persons:  
dr inż. Marek Skowronek  
dr hab. inż. Wojciech Witkowski

Full-time studies  
Department of Structural Mechanics and Bridge Structures

Year of study: I / Semester: 1  
Language: English

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Objectives: At the conclusion of the course, students should be able to:
- describe the elastic and elastic-perfectly plastic behaviour of 2D plane stress systems and plates at bending,
- analyse the perfectly plastic limit states,
- formulate the boundary problem for typical 2D plane stress systems and plates at bending.

Recommended literature:
Field of study: Civil Engineering

Full-time studies

Year of study: I / Semester: 1

Hours in semester

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ECTS Points: 4

Assessment: test

Topics:

Objectives:
- Knowledge on construction, dimensioning and design of reinforced concrete structures.

Recommended literature:
Field of study: Civil Engineering

Responsible Persons:
- dr inż. Aleksander Perliński
- prof. dr hab. inż. Robert Jankowski
- dr hab. inż. Piotr Iwicki, prof. PG

Full-time studies
- Department of Steel Structures and Construction Management
- Department of Structural Mechanics and Bridge Structures

Year of study: I / Semester: 1
Language: English

Hours in semester
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Objectives:
- knowledge on steel structural systems.

Recommended literature:
Field of study: Civil Engineering

Postgraduate studies (MSc – course)

Responsibility Person: mgr inż. Magdalena Pawelska-Mazur

Full-time studies

Department of Concrete Structure and Technology of Concrete

Year of study: I / Semester: 1

Language: English

Hours in semester

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Assessment: exam


Objectives: At the conclusion of the course, students should be able to:

- analyse different technological and logistic solutions,
- do the risk analysis,
- manage the construction process.

Recommended literature:

Field of study: Civil Engineering  
Postgraduate studies (MSc – course)  

Responsible Person: prof. dr hab. inż. Kazimierz Gwizdała

Full-time studies  
Department of Geotechnics, Geology and Maritime Engineering

Year of study: I / Semester: 1  
Language: English

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Assessment: test

Topics: Geotechnical design, geotechnical categories, geotechnical design methods. Foundations on the elastic bed, generalized Winkler model. Stress distribution under shallow foundations for \( e_U \neq 0, e_L \neq 0 \). Bearing capacity of shallow foundations, Polish regulations, Eurocode 7. Piled foundations – actual engineering solutions and static testing of the bearing capacity. Deep foundations, technologies, basic static schemes, calculations. Refurbishment and renovation of existing foundations.

Objectives: After the course students will be familiar with advanced methods of design and calculations of the shallow foundations, piled foundations and retaining structures. Parallelly they will learn some operational aspects in geotechnical engineering basing on the practical case histories.

Recommended literature:
1. Wilun Z.: Outline of geotechnics, WKŁ, Warszawa
9. Czasopisma n-t „Inżynieria Morska i Geotechnika”
10. Czasopisma n-t „Inżynieria i Budownictwo”
11. Czasopisma n-t „Geoinżynieria i Tunelowanie

Standards:
- PN-83/B-03010 Ściany oporowe. Obliczenia statyczne i projektowanie.
- PN-83/B-02482 Fundamenty budowlane. Nośność pali i fundamentów palowych.
- PN-EN 12699:2002 Execution of special geotechnical works – displacement piles.
- PN-EN 1536:2001 Execution of special geotechnical works. Bored Piles.
Field of study: **Civil Engineering**

**Postgraduate studies (MSc – course)**

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<tr>
<td><strong>dr hab. inż. Waldemar Magda</strong></td>
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<td><strong>dr inż. Witold Sterpejkowicz - Wersocki</strong></td>
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**Full-time studies**

<table>
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<tr>
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**Year of study:** I / **Semester:** 1

**Language:** **English**

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**Assessment:** test


**Objectives:** At the conclusion of the course, students should be able to:

- describe basic structures of the hydro-engineering and marine civil engineering,
- select a proper type of structure with respect to given water depth, wave and geotechnical conditions,
- define and compute forces acting on the structure due to environmental loading conditions,
- perform stability analysis and check some basic stability conditions for the structure under design.

**Recommended literature:**

Field of study: **Civil Engineering**  
Responsible person:  
**dr hab. inż. Michał Szydlowski, prof. PG**

### Full-time studies

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**Objectives:** Students should master the following capacities:
- analysis of hydrological processes in catchment,
- determination of open-channel hydraulic parameters, oriented towards problems of hydroengineering,
- hydraulic description of unsteady phenomena in pressure conduits.

**Recommended literature:**
Field of study: Civil Engineering

Postgraduate studies (MSc – course)

Responsible Person:
dr hab. inż. Wojciech Witkowski

Full-time studies

Department of Structural Mechanics and Bridge Structures

Year of study: I / Semester: 2

Language: English

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Assessment: exam


Recommended literature:

Field of study: Civil Engineering

Responsible Persons:
prof. dr hab. inż. Krzysztof Wilde
prof. dr hab. inż. Robert Jankowski

Full-time studies

Department of Structural Mechanics and Bridge Structures
Department of Steel Structures and Construction Management

Year of study: I / Semester: 2
Language: English

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Assessment: test


Objectives: At the conclusion of the course, students should be able to:
• understand wind and earthquake effects on structures,
• design the wind and seismic resistant structures,
• conduct numerical analysis of structural response under wind and earthquake excitation.

Recommended literature:
Field of study: **Civil Engineering**  
Responsible Persons:  
**dr inż. arch. Dominika Wróblewska**

**Full-time studies**  
Department of Geodesy

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**Topics:**  

**Objectives:**  
- understand advanced engineering surveying methods and its possibilities,
- use selected surveying instruments and applying them form measurements,
- ability to interpret and use surveying results in civil engineering practice,
- geodetic instrument accuracy determination.

**Recommended literature:**  
Field of study: **Civil Engineering**  
Postgraduate studies (MSc – course)  
Responsible Persons:  
**dr hab. inż. Jarosław Górski, prof. PG**  
**dr inż. Marek Skowronek**  

**Full-time studies**  
Department of Structural Mechanics and Bridge Structures  

**Year of study:** I / **Semester:** 2  
Language: **English**  

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<td>Assessment: <strong>test</strong></td>
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**Objectives:** At the conclusion of the course, students should be able to:  
- distinguish the basic methods to assess the reliability of structural systems,  
- understand the probabilistic methodology of building codes and standards.

**Recommended literature:**  
4. www.mek/dtu.dk/staff.od/books.htm  
**Field of study:** Civil Engineering

**Postgraduate studies (MSc – course)**

**Responsible Persons:**
- dr hab. inż. Krzysztof Żółtowski, prof. PG
- dr inż. Marcin Abramski

**Department of Structural Mechanics and Bridge Structures**

**Full-time studies**

**Year of study:** I / **Semester:** 2

**Language:** English


**Objectives:** At the conclusion of the course, students should be able to:
- name parts of bridge structures and describe their functions,
- determine types of bridges,
- recognize structural elements of bridge and explain system of carrying the loads by them,
- design and dimension of bridge structures,
- recognize equipments of bridge and their role for the structure.

**Recommended literature:**
**Field of study:** Civil Engineering  

**Postgraduate studies (MSc – course)**

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<td>dr inż. Jacek Alenowicz</td>
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<td>dr inż. Piotr Jaskula</td>
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<tr>
<td>dr inż. Lech Michalski</td>
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<td>dr inż. Andrzej Massel</td>
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**Full-time studies**

<table>
<thead>
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<th>Department of Road Engineering</th>
<th>Department of Railway Engineering</th>
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**Year of study:** I  
**Semester:** 2  
**Language:** English

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**Objectives:** At the conclusion of the course, students should be able to:  
- conduct geometric design of road and pavement design,  
- know technologies in road and rail construction.

**Recommended literature:**

Field of study: **Civil Engineering**  
Postgraduate studies (MSc – course)  

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<tr>
<td>dr hab. inż. Lech Balachowski, prof. PG</td>
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<td>dr hab. inż. Marcin Cudny</td>
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**Full-time studies**  
Department of Geotechnics, Geology and Maritime Engineering  

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**Objectives:** It is expected that after the course students will be able to find an appropriate geotechnical solution for the given practical problem and to calculate the deformation, bearing capacity and safety basing on the rules of the standard and advanced soil mechanics. This will include:

- design of shallow foundations, soil reinforcements, retaining structures, earth structures, deep excavations, combined pile-slab foundations,
- analysis of the soil ground behaviour with the application of the advanced soil constitutive models and numerical methods,
- evaluation of the soil ground suitability for different foundation technologies and estimation of the important material parameters for the basic and advanced analysis methods.

**Recommended literature:**

<table>
<thead>
<tr>
<th>Field of study: <strong>Civil Engineering</strong></th>
<th>Responsible Persons:</th>
</tr>
</thead>
</table>
| Postgraduate studies (MSc – course) | **prof. dr hab. inż. Krzysztof Wilde**  
|                                      | **dr hab. inż. Magdalena Rucka** |
| **Full-time studies**                | **Department of Structural Mechanics and Bridge Structures** |
| Year of study: **I** / Semester: **2**| **Language: English** |
| Hours in semester lec tut proj lab sem | **ECTS Points: 3** |
|                                      | **Assessment: test** |


**Objectives:** At the conclusion of the course, students should be able to:

- perform numerical simulations of structures under dynamic loads,
- possess knowledge on dynamic tests performed on structures.

**Recommended literature:**

<table>
<thead>
<tr>
<th>Field of study: Civil Engineering</th>
<th>Responsible Person: prof. dr hab. inż. Jacek Tejchman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postgraduate studies (MSc – course)</td>
<td>Department of Fundamentals of Building and Material Engineering</td>
</tr>
<tr>
<td>Full-time studies</td>
<td></td>
</tr>
<tr>
<td>Year of study: I / Semester: 2</td>
<td>Language: English</td>
</tr>
<tr>
<td>Hours in semester</td>
<td>lec</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment: attendance + topic presentation</td>
<td></td>
</tr>
<tr>
<td>Topics:</td>
<td>Presentation of diploma projects. Visiting building structures during their realisations. Preparation and presentation of building topics.</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Preparation for defending diploma works.</td>
</tr>
<tr>
<td>Recommended literature:</td>
<td>1. English building journals</td>
</tr>
<tr>
<td>Field of study: Civil Engineering</td>
<td>Responsible Person: prof. dr hab. inż. Paweł Kłosowski</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Postgraduate studies (MSc – course)</td>
<td>Department of Structural Mechanics and Bridge Structures</td>
</tr>
<tr>
<td>Full-time studies</td>
<td>Year of study: II / Semester: 3</td>
</tr>
<tr>
<td>Language: English</td>
<td></td>
</tr>
<tr>
<td>Hours in semester</td>
<td>ECTS Points: 3</td>
</tr>
<tr>
<td>lec</td>
<td>tut</td>
</tr>
</tbody>
</table>

**Topics:** Teaching of the advanced FEM programs usage of structural analysis. Ways of proper selection of the FEM computer system. Comparison of the systems’ possibilities – estimation of their strong and weak sides. Unaided performance of the comparison analysis of a structure and validation of the obtained results.

**Objectives:** To put a student au fait; with available advanced structure analysis systems – their advantages and drawbacks. Reaching ability of making the comparison analysis, validation of the results. Obtaining the results, presentation and discussion of their quality.

**Recommended literature:**
Field of study: **Civil Engineering**  
Postgraduate studies (MSc – course)  

<table>
<thead>
<tr>
<th>Responsible Persons:</th>
</tr>
</thead>
<tbody>
<tr>
<td>dr inż. Maria Przewłocka</td>
</tr>
<tr>
<td>dr inż. Beata Jaworska-Szulc</td>
</tr>
</tbody>
</table>

**Full-time studies**  
Department of Geotechnics, Geology and Maritime Engineering

Year of study: **II** / Semester: **3**  
Language: **English**

<table>
<thead>
<tr>
<th>Hours in semester</th>
<th>lec</th>
<th>tut</th>
<th>proj</th>
<th>lab</th>
<th>sem</th>
<th>ECTS Points: <strong>2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td>Assessment: <strong>test</strong></td>
</tr>
</tbody>
</table>

**Topics:** Geologic time, the Earth’s layers; plate tectonics theory; basic geological structures; geological processes; natural hazards (earthquakes, volcano eruptions, mass wasting); the rock cycle, the origin, recognition, description and utilisation of basic igneous, sedimentary and metamorphic rocks; landform development; fluvial, glacial and eolian processes; lithosphere as a source of natural resources; utilisation and protection of superficial deposits; human impact on the environment; groundwater occurrence – types of aquifers, gaining and losing streams; groundwater contour lines, hydrogeological cross-sections; aquifer characteristics; principles of groundwater flow; groundwater quality and protection; Analysis of geological and hydrogeological data: maps, cross-sections, profiles, reports; study of geomorphological and hydrogeological features of different regions in Poland; drawing geological and hydrogeological cross-sections; drawing groundwater contour lines

**Objectives:** The course broadens student’s understanding of Earth processes and materials, geological hazards; the influence of Earth processes on the Earth’s sculpture and composition. The course enables students to understand groundwater occurrence and the necessity of it’s protection. Student becomes acquainted with different kinds of geological and hydrogeological maps and is prepared to describe and analyse environmental conditions (geomorphological, geological and hydrogeological) of any region.

**Recommended literature:**
2. Press, Siever, Grotzinger, Jordan: *Understanding Earth.*
<table>
<thead>
<tr>
<th>Field of study: Civil Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postgraduate studies (MSc – course)</td>
</tr>
<tr>
<td>Full-time studies</td>
</tr>
<tr>
<td>Year of study: II / Semester: 3</td>
</tr>
<tr>
<td>Hours in semester</td>
</tr>
<tr>
<td>ECTS Points: 3</td>
</tr>
<tr>
<td>Assessment: presentation of report</td>
</tr>
</tbody>
</table>

**Topics:** Layout and style of MSc thesis written in English. Presentations related to topics of diploma thesis. Active participation of students in seminars and in discussions on presented reports.

**Objectives:** Learning of writing the MSc thesis in English, conducting the individual literature research, preparation of audio-visual presentations, public presentation and participation in discussions.

**Recommended literature:**
1. Scientific journals
2. Technical books
3. Internet