Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Technical English**		
Code	/WBIA/S2CE/A/01-1		
Field of specialisation			
Administering faculty	Studium Praktycznej Nauki Języków Obcych		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives	1	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
foreign language course	LK	1	45	3,0	1,00	examination

Leading teacher	Stelmaszczyk Marek (Marek.Stelmaszczyk@zut.edu.pl)
Other teachers	Kamińska Grażyna (Grazyna.Kaminska@zut.edu.pl), Kondyjowska Marzena (Marzena.Kondyjowska@zut.edu.pl), Obstawski Andrzej (Andrzej.Obstawski@zut.edu.pl)

Prerequisites

W-1	Knowledge of a language at B2 level acknowledged by the final exam or a language certificate at the required level.

Module/course unit objectives

C-1	Development of communicative and language competences for special purposes.
C-2	Ability of individual work with technical texts related to his/her major.

Course content divided into various forms of instruction		*Number of hours*
T-LK-1	Specialist vocabulary and text concerning the following subjects : Building materials	4
T-LK-2	Construction	3
T-LK-3	Reaching for perfection - a Greek temple Strategies and techniques of reading professional texts. Professional text structure.	3
T-LK-4	The challenges of marble	2
T-LK-5	The Bibliotheka Alexandrina Sentece structure in professional texts. Passive and related forms.	7
T-LK-6	How skyscrapers work	4
T-LK-7	The Empire State Building	4
T-LK-8	Introduction to tunneling	4
T-LK-9	Classification of bridges	2
T-LK-10	Evolution of bridges Collocations and idioms in scientific papers.	3
T-LK-11	Roads - terminology	3
T-LK-12	Roads - design	3
T-LK-13	. Roads - paving methods	3

Student workload - forms of activity		*Number of hours*
A-LK-1	Practical classes	45
A-LK-2	Preparation for classes	30
A-LK-3	Individual tutorials	3
A-LK-4	Preparation for exam	10
A-LK-5	Exam	2

Teaching methods / tools

M-1	Practical classes
M-2	Group work
M-3	Presentation

Teaching methods / tools	
M-4	Discussion
M-5	Work with text
M-6	Listening comprehension

Evaluation methods (F - progressive, P - final)		
S-1	F	Presentation (F)
S-2	F	Written exam (S)

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/01_W01 knows language structures used in specialist texts and selected specialist vocabulary for the programme of studies	B-A_2A_W16		P7S_WG_IA21	C-1	T-LK-1 T-LK-8 T-LK-2 T-LK-9 T-LK-3 T-LK-10 T-LK-4 T-LK-11 T-LK-5 T-LK-12 T-LK-6 T-LK-13 T-LK-7	M-1 M-2 M-3 M-5	S-1 S-2
Skills							
B-A_2A_A/A/01_U01 can speak on technical subjects related to his/her major	B-A_2A_U02 B-A_2A_U03 B-A_2A_U04 B-A_2A_U06	P7S_UK		C-1	T-LK-1 T-LK-8 T-LK-2 T-LK-9 T-LK-3 T-LK-10 T-LK-4 T-LK-11 T-LK-5 T-LK-12 T-LK-6 T-LK-13 T-LK-7	M-1 M-2 M-3 M-4 M-6	S-1 S-2
B-A_2A_A/A/01_U02 is able to understand texts and use basic specialist vocabulary in his/her field	B-A_2A_U06	P7S_UK		C-2	T-LK-1 T-LK-8 T-LK-2 T-LK-9 T-LK-3 T-LK-10 T-LK-4 T-LK-11 T-LK-5 T-LK-12 T-LK-6 T-LK-13 T-LK-7	M-1 M-5	S-1 S-2
Other social / personal competences							
B-A_2A_A/A/01_K01 is aware of the need of further education and self-improvement in developing language competences	B-A_2A_K06	P7S_KR		C-2	T-LK-1 T-LK-8 T-LK-2 T-LK-9 T-LK-3 T-LK-10 T-LK-4 T-LK-11 T-LK-5 T-LK-12 T-LK-6 T-LK-13 T-LK-7	M-1 M-3	S-2

Required reading
1. Eliza Romaniuk, Joanna Wrona, Modern Wonders of Civil Engineering, SPNJO Politechniki Krakowskiej, Kraków, 2007
2. Ilona Wojewódzka-Olszówka, Architecture in English – English for Architecture, SPNJO Politechniki Krakowskiej, Kraków, 2004
3. Eliza Romaniuk, Reader Friendly Civil Engineering, SPNJO Politechniki Krakowskiej, Kraków, 2005
4. Sandra Kuklińska-Stanek, Alicja Półtorak-Filipowska, Reading Companion for Students of Architecture, SPNJO Politechniki Krakowskiej, Kraków, 2006

Supplementary reading
1. Matt Ibbotson, Technical Construction Language, Intermediate Course No. 1, Cambridge
2. Quality Management in Construction, Advanced Course No. 6
3. B. Fletcher, HISTORY OF ARCHITECTURE, The Royal Institute of British Architects and University of London, 1996
4. E. Allen, FUNDAMENTALS OF BUILDING CONSTRUCTION. Materials and Methods, John Wiley and Sons, 1985
5. D.H. Besterfield, QUALITY CONTROL, Pearson Prentice Hall, 2004
6. Technical Construction Language. Intermediate Course No.1

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Polish Language and Culture**		
Code	WBiA/S2CE/A/01-2		
Field of specialisation			
Administering faculty	Studium Praktycznej Nauki Języków Obcych		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	polish
Electives	1	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
foreign language course	LK	1	45	3,0	1,00	examination

Leading teacher	Maziarz Anna (Anna.Maziarz@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Knowledge of English language at B2 level acknowledged by the final exam or a language certificate at the required level.

Module/course unit objectives

C-1	Development of communicative and language competences for special purposes.
C-2	Ability of individual work with technical texts related to his/her major.

Course content divided into various forms of instruction		*Number of hours*
T-LK-1	Greetings, farewell, introductions	4
T-LK-2	Presentation Yourself and others	3
T-LK-3	Interests, hobbies	3
T-LK-4	Medical assistance, how to communicate, where to call	2
T-LK-5	Situations: In the shop, In a caffe, restaurant	4
T-LK-6	Being the University student in Poland. Behaviour, typical situations, Dean's office. How to arrange matters?	7
T-LK-7	Polish history and culture, traditions	10
T-LK-8	Szczecin as a university town	2
T-LK-9	Basics of the Polish technical language in civil engineering	10

Student workload - forms of activity		*Number of hours*
A-LK-1	Practical classes	45
A-LK-2	Preparation for classes	30
A-LK-3	Individual tutorials	3
A-LK-4	Preparation for exam	10
A-LK-5	Exam	2

Teaching methods / tools

M-1	Practical classes
M-2	Group work
M-3	Presentation
M-4	Discussion
M-5	Work with text
M-6	Listening comprehension

Evaluation methods (F - progressive, P - final)

S-1	F	Presentation (F)
S-2	F	Written exam (S)

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_CE/A/01a_W01 knows language structures used in specialist texts and selected specialist vocabulary for the programme of studies	B-A_2A_W16		P7S_WG_IA21	C-1	T-LK-1 T-LK-6 T-LK-2 T-LK-7 T-LK-3 T-LK-8 T-LK-5 T-LK-9	M-1 M-2 M-3 M-5	S-1 S-2
Skills							
CE_2A_CE/A/01a_U01 can speak on technical subjects related to his/her major	B-A_2A_U02 B-A_2A_U03 B-A_2A_U04 B-A_2A_U06	P7S_UK		C-1	T-LK-1 T-LK-6 T-LK-2 T-LK-7 T-LK-3 T-LK-8 T-LK-5 T-LK-9	M-1 M-2 M-3 M-4 M-6	S-1 S-2
CE_2A_CE/A/01a_U02 is able to understand texts and use basic specialist vocabulary in his/her field	B-A_2A_U06	P7S_UK		C-2	T-LK-1 T-LK-6 T-LK-2 T-LK-7 T-LK-3 T-LK-8 T-LK-5 T-LK-9	M-1 M-5	S-1 S-2
Other social / personal competences							
CE_2A_CE/A/01a_K01 is aware of the need of further education and self-improvement in developing language competences	B-A_2A_K06	P7S_KR		C-2	T-LK-1 T-LK-6 T-LK-2 T-LK-7 T-LK-3 T-LK-8 T-LK-5 T-LK-9	M-1 M-3	S-2

Required reading

1. Polski krok po kroku - coursebook, 2011
2. Polski krok po kroku - exersise book, 2011
3. Learning platform: e-polish.eu, 2017

Supplementary reading

1. Matt Ibbotson, Technical Construction Language, Intermediate Course No. 1, Cambridge
2. B. Fletcher, HISTORY OF ARCHITECTURE, The Royal Institute of British Architects and University of London, 1996
3. Technical Construction Language. Intermediate Course No.1

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Intellectual property (copyright law)**		
Code	WBIA/S2CE/02-1		
Field of specialisation			
Administering faculty	Dziekanat		
ECTS	1,0	*ECTS (forms)*	1,0
Form of course credit	credits	*Language*	english
Electives	2	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	2	15	1,0	1,00	credits

Leading teacher	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl), Wojtkun Grzegorz (drossel@zut.edu.pl)

Prerequisites

W-1	Knowledge of basic legal terminology

Module/course unit objectives

C-1	Understanding the principles that underlie the legislative activities in Europe with regard to the ways and type of intellectual property protection. Legal aspects of protection of property and personal property rights.

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Legislation - general issues. Publishers , division of legal acts depending on their properties (act, ordinance, ordinance, resolution). Reminder of issues in the scope of the Administrative Procedure Code.	4
T-W-2	Code of administrative procedure. Proceedings (Section II). Initiation of proceedings, local and material property. Providing files. Evidence. Refusal to give evidence. Hearing. Suspension of proceedings. Decisions. The principle of writing.	4
T-W-3	International law on copyright and related rights - continuation. Coverage of copyright. Exclusions from copyright protection (discoveries, ideas, procedures, methods and principles of operation and mathematical concepts, but also normative acts or their official projects, official documents, materials, signs and symbols, published patent or protective descriptions, simple press releases) - overview .	7

Student workload - forms of activity		*Number of hours*
A-W-1	The student should actively participate in the lectures. In particular, he should show interest in the hypothetical situation presented by the lecturer and, if possible, present their own point of view and method of solving the problem during the didactic discussion related to the lecture. The student's participation in completing the course is participation in 4/5 the number of lectures and active participation in at least 3. teacher discussions initiated by the teacher at the end of the subscript.	15
A-W-2	The student is obliged to prepare for each lecture in accordance with the established schedule. In particular, he should familiarize himself with the obligatory literature on the issues under discussion and have notes enabling him to speak in the discussion initiated by the teacher in the final part of the lecture. The key activities are: 1. the ability to find and provide in the original wording of the legal provision regarding a hypothetical legal situation, 2. correct interpretation of the legal record, 3. providing the occurrence of possible contradictions, for example, the inclusion of an issue from the point of view of various entities of the investment process. The student should create and save the resulting study (books, non-books, databases, etc.).	15

Teaching methods / tools

M-1	Lecture method
M-2	Powerpoint presentation and case studies resolveing with teacher

Evaluation methods (F - progressive, P - final)

S-1	F	Countinous assessment of student work and activity

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods

Knowledge							
B-A_2A_A/A/03a_W01 As a result of the course the student should be able to define issues related to intellectual property rights, in particular legal aspects of copyright and related rights protection. The student should know the ways of legal protection of intellectual property to the extent necessary to independently perform design tasks in the field of design	B-A_2A_W14 B-A_2A_W15 B-A_2A_W16	P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1	T-W-1 T-W-3 T-W-2	M-1 M-2	S-1
Skills							
B-A_2A_A/A/03a_U01 As a result of the course, the student should be able to analyze legal acts in terms of ensuring intellectual protection of their own creations and not violating other people's copyright and related rights. The student should know the scope of legal and criminal responsibility for acts not allowed in the scope of copyright infringement.	B-A_2A_U26	P7S_UU		C-1	T-W-1 T-W-3 T-W-2	M-1 M-2	S-1
Other social / personal competences							
B-A_2A_A/A/03a_K01 As a result of the course, the student will acquire a conscious attitude in the field of legal and criminal scope of his own creative activity as well as acts undertaken towards other artists and their work. The knowledge should enable him to act in accordance with his own conviction and not to violate applicable law in the area of protection of copyright and related rights under copyright law.	B-A_2A_K09	P7S_KR		C-1	T-W-1 T-W-3 T-W-2	M-1 M-2	S-1

Required reading

1. Paul Goldstein, Bernt Hugenholz, International Copyright: Principles, Law, and Practice 3rd Edition, Oxford, 2012, 3, ISBN-13: 978-0199794294

2. Editor: Adam Jolly, The Handbook of European Intellectual Property Management Developing, managing and protecting your company’s intellectual property, Kogan Page, 2015, 4th Edition

3. Vivien Irish, Intellectual Property Rights for Engineers, The Institution of Engineering and Technology, 2005, 2nd Edition

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Intellectual property**		
Code	WBIA/S2CE/02-2		
Field of specialisation			
Administering faculty	Dziekanat		
ECTS	1,0	*ECTS (forms)*	1,0
Form of course credit	credits	*Language*	english
Electives	2	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	2	15	1,0	1,00	credits

Leading teacher	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Basic knowledge of industrial property.

Module/course unit objectives

C-1	To gain knowledge in industrial property protection, to understand and use international conditions associated to application procedures.

Course content divided into various forms of instruction		*Number of hours*
T-W-1	General information, protection of industrial property. International organizations for intelectual property protection	2
T-W-2	Iventions and utility patterns, international procedure PCT of application, European patent.	4
T-W-3	Industrial patterns, application procedure in international perspective.	2
T-W-4	Trade-marks, application procedure.	3
T-W-5	Patent information, patent classification.	4

Student workload - forms of activity		*Number of hours*
A-W-1	Presence on lectures	15
A-W-2	Preparation to lectures, review of materials	4
A-W-3	Patent data base research	4
A-W-4	Preparation for subject passing	5
A-W-5	Consultancies	1
A-W-6	Test	1

Teaching methods / tools

M-1	Lecture with presentation

Evaluation methods (F - progressive, P - final)

S-1	F	activity assessment on lectures
S-2	P	written test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/03b_W01 knows the legal frames of intelectual and industrial property protection, sources of patent information, knows definitions of basic items of protection.	B-A_2A_W15	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3	M-1	S-1 S-2
Skills							

B-A_2A_A/A/03b_U01 can estimate if his intellectual work effect may be protected, can choose the specific manner of intellectual protection, can use available data base.	B-A_2A_U11 B-A_2A_U26	P7S_UK P7S_UU		C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3	M-1	S-1 S-2
Other social / personal competences							
B-A_2A_A/A/03b_K01 student will use legal possibilities to protect his own intellectual work effects and will use creative results of other people according to international law. Student will use effrctivelly available data bases.	B-A_2A_K07 B-A_2A_K09	P7S_KR		C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3	M-1	S-1 S-2

Required reading

1. John Palfrey, Intellectual Property Strategy, MIT Press, Boston Masachusets USA, 2011, ISBN: 9780262297998

2. Ed.: Adam Jolly, The Handbook of European Intellectual Property Management Developing, Kogan Press, 2015

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**PHS - History of Art**		
Code	WBIA/S2CE/A/03-1		
Field of specialisation			
Administering faculty	Katedra Sztuk Wizualnych		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives	3	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	1	30	2,0	1,00	credits

Leading teacher	Szczepanik Joanna (jszczepanik@zut.edu.pl)
Other teachers	Arlet Joanna (arlet@zut.edu.pl), Rutyna Halina (rutyna@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Basic knowledge of history and art history is required.

Module/course unit objectives

C-1	Understanding the leading trends and styles in art from antiquity to modern times. Preparation of the board on a selected topic in the history of art.

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Introduction. Ancient and Roman art	2
T-W-2	Gothic art	4
T-W-3	Art in the renaissance	2
T-W-4	Baroque art	4
T-W-5	Classicism and romanticism	2
T-W-6	Art nouveau and impressionism	2
T-W-7	Modernism and vanguard	4
T-W-8	Around neo-vanguard	4
T-W-9	Contemporary art	4
T-W-10	Passing lectures	2

Student workload - forms of activity		*Number of hours*
A-W-1	Obligatory participation in classes	30
A-W-2	Own work	20
A-W-3	Preparation of a synthetic A3 format board on a topic selected from the lecture	10

Teaching methods / tools

M-1	Lecture with multimedia presentation / computer with multimedia projector.

Evaluation methods (F - progressive, P - final)

S-1	F	Students are required to complete a board on a selected topic, obtaining information from literature and databases.
S-2	F	Passing the colloquium

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

B-A_2A_A/A/02-1_W01 Student acquires knowledge about the history of art. recognizes styles and can characterize their features. He knows the latest trends and trends. He recognizes the works of outstanding artists.	B-A_2A_W16		P7S_WG_IA21	C-1	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1	S-1 S-2
Skills							
B-A_2A_A/A/02-1_U01 Student can acquire and make data selection. He interprets data properly and is able to integrate and present them.	B-A_2A_U26	P7S_UU		C-1	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1	S-1 S-2
B-A_2A_A/A/02-1_U02 Student is able to integrate knowledge of art history.	B-A_2A_U26	P7S_UU		C-1	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1	S-1 S-2
Other social / personal competences							
B-A_2A_A/A/02-1_K01 Reliably develops and presents the results of his/her work.	B-A_2A_K09	P7S_KR		C-1	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1	S-1 S-2

Required reading

1. Ernest Gombrich, The Story of Art, Phaidon Press Limited, London, 1950

Supplementary reading

1. Jan Białostocki, The Message of Images. Studies in the History of Art, Irsa Verlag, 1988

2. Arnason H. Harvard, History of Modern Art: Painting, Sculpture, Architecture, Photography., Upper Saddle River, N.J., Prentice Hall, 2004

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**PHS - History of Civil Engineering**		
Code	WBIA/S2CE/A/03-2		
Field of specialisation			
Administering faculty	Katedra Geotechniki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives	3	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	1	30	2,0	1,00	credits

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	Nauczyciel WBiA - (a@b), Paczkowski Wiesław (Wieslaw.Paczkowski@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites	
W-1	English skills at least at B2 level
W-2	Bachelor's degree in civil engineering

Module/course unit objectives	
C-1	To widen student knowledge on civil engineering from historical perspective.
C-2	To show impact of crucial technologiies, building materials on society over last centuries as well as on economy, environment and industry.

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Crucial developments in civil engineering over last centuries, new technologies and their impact on built environment. Social and economic aspects of selected structures over the world	4
T-W-2	Progress of concrete structures over last decades, new technologies, spectacular structures and their impact on economy and history in local and global scale	3
T-W-3	Bridges as crucial structures in Europe and other continents. Signifficance and modern technologies discussed on case studies	4
T-W-4	Geotechnical engineering, modern technologies of soil improvement and their impact on environment. Development of soil testing and research	4
T-W-5	Massive hydrotechnical structures built over last decades, their influence on society, environment, local and in larger scale economy, flood protection and water management in chosen countries, case studies	6
T-W-6	Roads infrastructure development in European, Asiatic and American continents over last decades. The role of communication systems in society, global transport issues, logistics in large scale. History of implementation new construction materials and new technologies.	6
T-W-7	Steel structures technologies used as method of civil engineering development, case studies	3

Student workload - forms of activity		*Number of hours*
A-W-1	Attendance on lectures	30
A-W-2	Desk study supported by literature and internet sources	15
A-W-3	Consultancies and discussions	5
A-W-4	Preparations to pass the module	7
A-W-5	Oral completion of the subject	2

Teaching methods / tools	
M-1	lecture with problem method

Evaluation methods (F - progressive, P - final)		
S-1	P	discussion and oral formulation of student's opinion

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods

Knowledge							
B-A_2A_A/A/02-2_W01 Student has knowledge on developments in civil engineering from various field in construction industry, knows the main aspects of crucial achievements over last centuries with additional knowledge on economical, social, environmental impact of used technologies and materials over years	B-A_2A_W05 B-A_2A_W07 B-A_2A_W13 B-A_2A_W14	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4	M-1	S-1
Skills							
B-A_2A_A/A/02-2_U01 Student is able to estimate complex civil engineering tasks from historical, social, environmental and economical perspective and analyse contemporary trends in civil engineering from historical and crucial achievements.	B-A_2A_U14 B-A_2A_U16 B-A_2A_U26	P7S_UU P7S_UW_TA24		C-1 C-2	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4	M-1	S-1
Other social / personal competences							
B-A_2A_A/A/02-2_K01 Student understands the infuence of civil engineering activity on society, economy, environment from historical perspective with reference to discussed case studies.	B-A_2A_K03 B-A_2A_K04 B-A_2A_K09	P7S_KK P7S_KR		C-1 C-2	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4	M-1	S-1

Required reading

1. Literature Base Knovel, Civil Engineering and Construction Materials

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Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**PHS - History of Architecture**		
Code	WBIA/S2CE/A/03-3		
Field of specialisation			
Administering faculty	Katedra Historii i Teorii Architektury		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives	3	*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	1	30	2,0	1,00	credits

Leading teacher	Arlet Joanna (arlet@zut.edu.pl)
Other teachers	Paszkowski Zbigniew (zbigniew.paszkowski@gmail.com)

Prerequisites	
W-1	Prerequisite information on history, art history and architecture at the high school level is required.

Module/course unit objectives	
C-1	Understanding the leading trends and styles in European and Polish architecture from antiquity to modern times. Recognition of the style based on their characteristic features.
C-2	To stimulate interest in the subject through data synthesis, analysis and graphic development of boards in the field

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Architecture of ancient Greece and Rome. The main architectural rules	2
T-W-2	Romanesque architecture in Europe and in Poland. Main objects and their features.	2
T-W-3	Gothic architecture in Europe. The main examples and features of the style.	2
T-W-4	Gothic architecture in Poland. Characteristic plans of medieval cities and villages.	2
T-W-5	Renaissance in Europe. Background of epoch, features of style, the most prominent creators.	2
T-W-6	Renaissance in Poland. Famous creators and their works.	2
T-W-7	Baroque in Europe, backgrround of the epoch, buildings and their creators. Urban planning of the baroque period.	2
T-W-8	Baroque in Poland, background of the epoch, buildings and their creators.	2
T-W-9	Classicism in Europe, the main architects and mainstreams.	2
T-W-10	Classicism in Poland, main architects and mainstreams. Urbanism of the Classicism period.	2
T-W-11	Secession in Europe and in Poland. The beginnings of contemporary architecture.	2
T-W-12	Architecture of the first half of the twentieth century. Modernism, Expressionism, International Style of architecture.	2
T-W-13	Contemporary architecture in Europe, main trends and their creators.	2
T-W-14	Contemporary architecture in Poland.	2
T-W-15	Passing lectures.	2

Student workload - forms of activity		*Number of hours*
A-W-1	mandatory participation in lectures.	30
A-W-2	Analyzing the material from the lecture.	20
A-W-3	Preparing the board on a selected topic in the field of lectures.	10

Teaching methods / tools	
M-1	Informative lecture with multimedia presentation/a computer with a multimedia projector.

Evaluation methods (F - progressive, P - final)		
S-1	F	Students are required to create a synthetic board on a selected topic, based on literature and databases.
S-2	P	Students are required to pass the final colloquium.

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/02-3_W16 Students understands main styles in history of architecture. Students knows the basic terminlogy of architecture and culture.	B-A_2A_W14 B-A_2A_W16	P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1 S-2
Skills							
B-A_2A_A/A/02-3_U01 Student is able to obtain information from literature, data bases, integrate and interpret it	B-A_2A_U01	P7S_UK		C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1 S-2
B-A_2A_A/A/02-3_U05 The student develops the possibilities of self-education.	B-A_2A_U05	P7S_UU		C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1 S-2
Other social / personal competences							
B-A_2A_A/A/02-3_K02 Student is responsibile and knows how to cooperate with the team.	B-A_2A_K02	P7S_KK		C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1 S-2

Required reading

1. Watkin David, A History of Western Architecture, Laurence King Publishers, University of Michigan, 2005, ISBN 1856694593

2. Nicolaus Pevsner, An outline of European Architecture, Gibbs Smith, 2009, ISBN-10: 1423604938

3. Adam Miłobędzki, The Architecture of Poland. A chapter og European heritage., 1994

Supplementary reading

1. Keneeth Frampton, Modern Architecture: A critical History, World of Art., Oxford University Press, 1980

2. Owen Hopkins, Architectural styles a visual quide., Laurence Kong Publishing, London, 2014

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Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**PHS - History of Engineering Structures**		
Code	WBIA/S2CE/A/03-4		
Field of specialisation			
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives	3	*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	1	30	2,0	1,00	credits

Leading teacher	Paczkowski Wiesław (Wieslaw.Paczkowski@zut.edu.pl)
Other teachers	Abramowicz Małgorzata (Malgorzata.Abramowicz@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Wróblewski Tomasz (Tomasz.Wroblewski@zut.edu.pl)

Prerequisites	
W-1	Strength of materials
W-2	Masonry, timber, concrete and steel structures

Module/course unit objectives	
C-1	Presentation of historical development of different types of sructures using basic scheme of presentation: historical development of the theory, typical and outstanding realizations of constructions, problems of erection and other problems accompaning given type of structure.
C-2	Presentation of structural failures and other drawbacks displayed during the erection and exploatation process

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Social and legal aspects of building activity in historical process	2
T-W-2	Natural and man-made structural forms	1
T-W-3	Acient constructions	2
T-W-4	Sanctuary constructions	2
T-W-5	Bridges - the leading structures in innovation developments	4
T-W-6	Medium-rise buildings	2
T-W-7	High-rise buildings	4
T-W-8	Towers and masts	2
T-W-9	Lettice shell structure of the Shukhov Tower in Moscow - case study	1
T-W-10	Hydrotechnical structures	1
T-W-11	Industrial structures: industrial halls, power stations, chimneys, tanks	3
T-W-12	Letticed space frames	1
T-W-13	Off-shore structures and problems of inspection and reliability	1
T-W-14	Failures of engineering structures	2
T-W-15	Pass test of the lectures	2

Student workload - forms of activity		*Number of hours*
A-W-1	Presence on lectures	28
A-W-2	Pass test of the lectures	2
A-W-3	Own work of student	30

Teaching methods / tools	
M-1	lecture illustrated by slides

Evaluation methods (F - progressive, P - final)		
S-1	P	Pass test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_A/A/02-4_W01 Student posesses knowledge based on mathematical and mechanical basis of main processes and trends which influenced historical development of engineering structures starting from very early forms and ending with contemporary sophisticated and advanced structures with a clear relation to social, economic, legal and enviromental effects.	B-A_2A_W01 B-A_2A_W05 B-A_2A_W13 B-A_2A_W14	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1
Skills							
CE_2A_A/A/02-4_U01 Student is able to see and understand all aspects of own engineering activity judged on the basis of properly selected sources, also in foreign languages and to interpret contemporary trends of developments in technical and non-technical aspects by comparing with experience coming from historical knowledge.	B-A_2A_U01 B-A_2A_U11 B-A_2A_U13 B-A_2A_U26	P7S_UK P7S_UO P7S_UU P7S_UW_TA22 P7S_UW_TA23		C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1
Other social / personal competences							
CE_2A_A/A/02-4_K01 Student is aware of importance of his activity for the society and understands technical and non-technical consequences including environmental ones, understands the meaning of sustainable development and importance of continuos development of his professional and personal competences including ability of proper communication with the society.	B-A_2A_K03 B-A_2A_K04 B-A_2A_K06 B-A_2A_K08	P7S_KK P7S_KO P7S_KR		C-1 C-2	T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15 T-W-8	M-1	S-1

Required reading

1. Mainstone R. J., Developments in Structural Form, Taylor & Francis Group, Oxford, 2001

2. Heyman J., The Science of Structural Engineering, Imperial College Press, London, 1999

3. Dowling P. J., Structural Steel design, Butterworths, London, 1998

Supplementary reading

1. Timoshenko S. P., History of Strength of Materials, McGraw-Hill Book Company, New York, 1953

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**PS - Ethics in Business**		
Code	WBIA/S2CE/A/04-1		
Field of specialisation			
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	1,0	*ECTS (forms)*	1,0
Form of course credit	credits	*Language*	english
Electives	4	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	3	15	1,0	1,00	credits

Leading teacher	Araszkiewicz Krystyna (Krystyna.Araszkiewicz@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Knowledge of the basics of economics

Module/course unit objectives

C-1	Getting the knowledge of the principles of corporate social responsibility and the concept of sustainable development

Course content divided into various forms of instruction		*Number of hours*
T-W-1	The concept of business. Entrepreneurship in the theory of economics.	1
T-W-2	Subject, objectives and methods of ethics. Basic concepts. Ethical systems: premises and ways to justify moral choices and judgments.	1
T-W-3	Ethical dimension of management. The genesis of business ethics. An enterprise as a moral entity. The specificity of ethical analysis of economic issues.	2
T-W-4	Competitiveness - definition and essence, the process of achieving and maintaining competitiveness. Ethical dimension of competition.	2
T-W-5	Conflict of economic and social values. The concept of sustainable development.	2
T-W-6	Corporate Social Responsibility (CSR) - history, standards, principles. Good CSR practices on the example of Polish and global companies.	2
T-W-7	Ethical dimension of human resources management. Organisational culture and social capital of a company.	2
T-W-8	Principles of engineering ethics in the practice of design, implementation and operation of technical facilities.	2
T-W-9	Final test	1

Student workload - forms of activity		*Number of hours*
A-W-1	Participation in lectures	14
A-W-2	Own work, self-study	15
A-W-3	final test	1

Teaching methods / tools

M-1	Informative lecture, explanation, case studies discussion

Evaluation methods (F - progressive, P - final)

S-1	P	final written test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/04-8_W01 The student knows the assumptions of the concept of corporate social responsibility	B-A_2A_W14 B-A_2A_W16	P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4 T-W-8	M-1	S-1

Skills							
B-A_2A_A/A/04-8_U01 The student is able to define the principles of reponsible, ethical business activities	B-A_2A_U26	P7S_UU		C-1	T-W-3 T-W-7 T-W-4 T-W-8 T-W-6	M-1	S-1
Other social / personal competences							
B-A_2A_A/A/04-8_K01 The student has the competence to identify and discuss ethical issues related to the functioning of business entities	B-A_2A_K09	P7S_KR		C-1	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4 T-W-8	M-1	S-1

Required reading
1. Phillips, Robert, Stakeholder theory and organizational ethics, Berrett-Koehler, San Francisco, 2003
2. Copp, D. (ed.), The Oxford Handbook of Ethical Theory, OUP, Oxford, 2010

Supplementary reading
1. Institute for Global Ethics, https://www.globalethics.org/, 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**PS - Ethic and Social Aspects of Economic Activity**		
Code	WBIA/S2CE/A/04-2		
Field of specialisation			
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	1,0	*ECTS (forms)*	1,0
Form of course credit	credits	*Language*	english
Electives	4	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	3	15	1,0	1,00	credits

Leading teacher	Araszkiewicz Krystyna (Krystyna.Araszkiewicz@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Knowledge of the basics of economics

Module/course unit objectives

C-1	Getting to know the most important issues in the field of economic ethics and arousing the attitude of sensitivity to moral conflicts accompanying business
C-2	Acquainting with the principles of corporate social responsibility and company relations with its social and economic environment

Course content divided into various forms of instruction		*Number of hours*
T-W-1	The concept of business. Entrepreneurship in the theory of economics. Features of the entrepreneur and his role in the modern market economy	1
T-W-2	Subject, objectives and methods of ethics. Basic concepts. Ethical systems: premises and ways to justify moral choices and judgments.	1
T-W-3	Ethical dimension of management. The genesis of business ethics. An enterprise as a moral entity. The specificity of ethical analysis of economic issues.	2
T-W-4	Competitiveness - definition and essence, the process of achieving and maintaining competitiveness. Ethical dimension of competition. Utilitarianism: corruption, monopolistic practices	2
T-W-5	Economic growth and economic development. Theories of growth: classic, endogenous, neoclassical. Convergence. Conflict of economic and social values. The economic dimension of sustainable development.	2
T-W-6	Corporate Social Responsibility (CSR) - history, standards. Principles of corporate social responsibility in EU policy. Good CSR practices on the example of Polish and global companies.	2
T-W-7	Work and its ethical dimension. Business ethics as a business management tool. Assumptions, methods and achievements of ethics based on the idea of human responsibilities, the concept of responsibility, responsibility as care, the conditions for responsible action	2
T-W-8	The ethics of the profession of an engineer in the light of the FEANI code, the Polish Chamber of Civil Engineers and other professional associations. Principles of engineering ethics in the practice of design, implementation and operation of technical facilities.	2
T-W-9	Final test	1

Student workload - forms of activity		*Number of hours*
A-W-1	Participation in lectures	14
A-W-2	Own work, self-study	15
A-W-3	final test	1

Teaching methods / tools

M-1	Informative lecture, explanation, case studies discussion

Evaluation methods (F - progressive, P - final)

S-1	P	final written test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/04-3_W01 The student has knowledge of the ethical principles of running a business and the importance of business ethics in socio-economic development	B-A_2A_W14 B-A_2A_W16	P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4 T-W-8	M-1	S-1
B-A_2A_A/A/04-3_W02 The student knows the assumptions of the concept of corporate social responsibility	B-A_2A_W14 B-A_2A_W16	P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-W-5 T-W-7 T-W-6	M-1	S-1
Skills							
B-A_2A_A/A/04-3_U01 Student is able to interpret solutions undertaken by entrepreneurs in a situation of moral conflict	B-A_2A_U26	P7S_UU		C-1 C-2	T-W-1 T-W-3 T-W-2 T-W-4	M-1	S-1
B-A_2A_A/A/04-3_U02 The student can determine the attitude of responsibility for decisions related to professional and business activities	B-A_2A_U26	P7S_UU		C-1 C-2	T-W-3 T-W-7 T-W-4 T-W-8 T-W-6	M-1	S-1
Other social / personal competences							
B-A_2A_A/A/04-3_K01 The student has the competence to identify and analyze ethical issues related to the functioning of business entities	B-A_2A_K09	P7S_KR		C-1 C-2	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4 T-W-8	M-1	S-1

Required reading

1. Phillips, Robert, Stakeholder theory and organizational ethics, Berrett-Koehler, San Francisco, 2003

2. Copp, D. (ed.), The Oxford Handbook of Ethical Theory, OUP, Oxford, 2010

Supplementary reading

1. Institute for Global Ethics, https://www.globalethics.org/, 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Diploma Thesis ES**		
Code	WBIA/S2CE/A/05-1		
Field of specialisation			
Administering faculty	Dziekanat		
ECTS	20,0	*ECTS (forms)*	20,0
Form of course credit	credits	*Language*	english
Electives	5	*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
	PD	3	0	20,0	1,00	credits

Leading teacher	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	all subjects passed
W-2	Basics of Scientific Information passed

Module/course unit objectives	
C-1	to assess the capability of the student to undertake independent research based work at Master level
C-2	creation of competency to use information technics, protection of copyright law and professional ethics. To create ability of written report on professional activity, analyses, calculations, design process.
C-3	to know basic rules how to use source material, how to prepare own conclusions, opinions, being an effect of realized work.
C-4	to create an ability to make a medial presentation from the topics covering final thesis and studied specialisation.
C-5	to create an ability to prepare conclusions and analysis result on final thesis content.

Course content divided into various forms of instruction		*Number of hours*
T-PD-1	Diploma thesis preparation, power point presentation.	0

Student workload - forms of activity		*Number of hours*
A-PD-1	Desk study	86
A-PD-2	Research work on given topic	145
A-PD-3	Consultances with thesis tutor, discussions and conclusions	65
A-PD-4	Preparation of thesis introduction, assumptions for final thesis, creation of literature review, execution of research work, tests, graphs, analysis of results. Additional tests, research, literature. Discussion on chapters order, final remarks and conclusions. Draft version of final thesis, correction procedure, final list of used sources. Final version of the thesis, printing, preparation for presentation of main topics and results.	300

Teaching methods / tools	
M-1	classic problem method
M-2	activating mathods

Evaluation methods (F - progressive, P - final)		
S-1	P	Final assessment of Master thesis

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/05-3_W01 student has knowledge from chosen items associated with specialization, about trends and the main new achievements in civil engineering and knows how to protect copyright law and industrial property.	B-A_2A_W02 B-A_2A_W05 B-A_2A_W06 B-A_2A_W13 B-A_2A_W14 B-A_2A_W15	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2 C-3 C-4 C-5	T-PD-1	M-1 M-2	S-1

Skills							
B-A_2A_A/A/05-3_U01 Student is able to choose specialistic tools and CAD software supporting designers work or/and adopt existing tools or develop new ones to formulate hypothesis related to engineering problems and basic research problems. For developed aspects connected to diploma thesis student is able to gain literaure sources, and is able to prepare scientific paper and multimedial presentation.	B-A_2A_U01 B-A_2A_U03 B-A_2A_U04 B-A_2A_U05 B-A_2A_U07 B-A_2A_U12 B-A_2A_U19	P7S_UK P7S_UO P7S_UU P7S_UW_TA21 P7S_UW_TA22 P7S_UW_TA24	P7S_UW_IA22	C-1 C-2 C-3 C-4 C-5	T-PD-1	M-1 M-2	S-1
Other social / personal competences							
B-A_2A_A/A/05-3_K01 Student is exposing responsibility for his/her work as well as for the other participants of work, uses rules of professional ethics and uderstands the necessity to share his/her knowledge to the society in form of conclusions, descriptions relevant to priorities for execution of civil engineering activities. Is ready to update his/her professional and personal competences. Completes knowledge of modern processes, technologies management tools in building industry.	B-A_2A_K01 B-A_2A_K02 B-A_2A_K06 B-A_2A_K09	P7S_KK P7S_KR		C-1 C-2 C-3 C-4 C-5	T-PD-1	M-1 M-2	S-1

Required reading

1. according to the topic of prepared Master thesis

Supplementary reading

1. suggested by diploma thesis tutor, 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Diploma Thesis ICM**		
Code	WBIA/S2CE/A/05-2		
Field of specialisation			
Administering faculty	Dziekanat		
ECTS	20,0	*ECTS (forms)*	20,0
Form of course credit	credits	*Language*	english
Electives	5	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
	PD	3	0	20,0	1,00	credits

Leading teacher	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	all subjects passed
W-2	Basics of Scientific Information passed

Module/course unit objectives	
C-1	to assess the capability of the student to undertake independent research based work at Master level
C-2	creation of competency to use information technics, protection of copyright law and professional ethics. To create ability of written report on professional activity, analyses, calculations, design process.
C-3	to know basic rules how to use source material, how to prepare own conclusions, opinions, being an effect of realized work.
C-4	to create an ability to make a medial presentation from the topics covering final thesis and studied specialisation.
C-5	to create an ability to prepare conclusions and analysis result on final thesis content.

Course content divided into various forms of instruction		*Number of hours*
T-PD-1	Diploma thesis preparation, power point presentation.	0

Student workload - forms of activity		*Number of hours*
A-PD-1	Desk study	86
A-PD-2	Research work on given topic	145
A-PD-3	Consultances with thesis tutor, discussions and conclusions	65
A-PD-4	Preparation of thesis introduction, assumptions for final thesis, creation of literature review, execution of research work, tests, graphs, analysis of results. Additional tests, research, literature. Discussion on chapters order, final remarks and conclusions. Draft version of final thesis, correction procedure, final list of used sources. Final version of the thesis, printing, preparation for presentation of main topics and results.	300

Teaching methods / tools	
M-1	classic problem method
M-2	activating mathods

Evaluation methods (F - progressive, P - final)		
S-1	P	Final assessment of Master thesis

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/05-2_W01 student has knowledge from chosen items associated with specialization, about trends and the main new achievements in civil engineering and knows how to protect copyright law and industrial property.	B-A_2A_W02 B-A_2A_W05 B-A_2A_W06 B-A_2A_W13 B-A_2A_W14 B-A_2A_W15	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2 C-3 C-4 C-5	T-PD-1	M-1 M-2	S-1

Skills							
B-A_2A_A/A/05-2_U01 Student is able to choose specialistic tools and CAD software supporting designers work or/and adopt existing tools or develop new ones to formulate hypothesis related to engineering problems and basic research problems. For developed aspects connected to diploma thesis student is able to gain literaure sources, and is able to prepare scientific paper and multimedial presentation.	B-A_2A_U01 B-A_2A_U03 B-A_2A_U04 B-A_2A_U05 B-A_2A_U07 B-A_2A_U12 B-A_2A_U19	P7S_UK P7S_UO P7S_UU P7S_UW_TA21 P7S_UW_TA22 P7S_UW_TA24	P7S_UW_IA22	C-1 C-2 C-3 C-4 C-5	T-PD-1	M-1 M-2	S-1
Other social / personal competences							
B-A_2A_A/A/05-2_K01 Student is exposing responsibility for his/her work as well as for the other participants of work, uses rules of professional ethics and uderstands the necessity to share his/her knowledge to the society in form of conclusions, descriptions relevant to priorities for execution of civil engineering activities. Is ready to update his/her professional and personal competences. Completes knowledge of modern processes, technologies management tools in building industry.	B-A_2A_K01 B-A_2A_K02 B-A_2A_K06 B-A_2A_K09	P7S_KK P7S_KR		C-1 C-2 C-3 C-4 C-5	T-PD-1	M-1 M-2	S-1

Required reading

1. according to the topic of prepared Master thesis

Supplementary reading

1. suggested by diploma thesis tutor, 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Diploma Seminar - prof. Iwankiewicz**		
Code	WBIA/S2CE/A/06-1		
Field of specialisation			
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives	6	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
diploma/thesis seminars	SD	3	45	3,0	1,00	credits

Leading teacher	Iwankiewicz Radosław (riwankiewicz@zut.edu.pl)
Other teachers	Silicki Adrian (Adrian.Silicki@zut.edu.pl)

Prerequisites

W-1	Courses pertinent to MSc in Engineering degree course

Module/course unit objectives

C-1	Capability to present the concepts, the progress and the findings of MSc thesis.

Course content divided into various forms of instruction		*Number of hours*
T-SD-1	Attending seminars and making own presentation(s).	45

Student workload - forms of activity		*Number of hours*
A-SD-1	Attending the seminars.	45
A-SD-2	Preparing own presentation(s).	45

Teaching methods / tools

M-1	Seminars.

Evaluation methods (F - progressive, P - final)

S-1	F	Seminar presentation(s).

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/A/06b_W01 Student should be able to formulate and develop fundamental research concepts essential for his/her MSc thesis.	B-A_2A_W02	P7S_WG_TA21	P7S_WG_IA21	C-1	T-SD-1	M-1	S-1
Skills							
B-A_2A_A/A/06b_U01 Student should have a capability to present at different stages the concepts, the progress and the findings of MSc thesis.	B-A_2A_U02 B-A_2A_U04	P7S_UK		C-1	T-SD-1	M-1	S-1
Other social / personal competences							
B-A_2A_A/A/06b_K01 Student should be able to make an oral/computer presentation of different stages his/her MSc thesis and to take active part in seminar discussions.	B-A_2A_K01	P7S_KK		C-1	T-SD-1	M-1	S-1

Required reading

1. Literature according to the subject of student's MSc thesis.

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Diploma Seminar - prof. Kaszyńska**		
Code	WBIA/S2CE/A/06-2		
Field of specialisation			
Administering faculty	Katedra Konstrukcji Żelbetowych i Technologii Betonu		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives	6	*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
diploma/thesis seminars	SD	3	45	3,0	1,00	credits

Leading teacher	Kaszyńska Maria (Maria.Kaszynska@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Passed all courses from the specialty

Module/course unit objectives	
C-1	Acquiring knowledge on writing thesis
C-2	Acquiring ability to utilize information techniques, compliance with copyright laws and work ethics
C-3	Acquiring ability to prepare and present the results of the studies and conducted assignment within thesis range
C-4	Acquiring ability to formulate the thesis summary

Course content divided into various forms of instruction		*Number of hours*
T-SD-1	Basic information about the thesis and examination rules. Specification of design and experimental thesis. General rules for preparation of the thesis plan. Preparations: initial arrangement of the thesis.	4
T-SD-2	Division of the thesis, arrangement, chapters and subchapters. Basic content of the introduction. Individual preparation of the initial thesis arrangement. Choice of research methods forexperimental studies, study design methods. Determination of the initial concept in case of design project.	3
T-SD-3	Methods of indexing acquired data. Source selection, databases, note indexing, preparations of reference list.	3
T-SD-4	Basic rules of intellectual property protection, copyrights and patent protection in thesis preparation	4
T-SD-5	Basic rules of thesis writing (title page, chapter's first page, margin alignment, page indexing, table, figures and equations indexing)	4
T-SD-6	Preparation of table of content, attachments, figures. Rules for index preparation and design drawing in projects	4
T-SD-7	Rules for PowerPoint presentation preparations	4
T-SD-8	Technical issues related to thesis. Methods for experimental data analysis. Delivering an oral presentation in the thesis range by each individual	7
T-SD-9	Examples of conclusions, ending and summary of the thesis. Determination of the practical use of acquired results	4
T-SD-10	Presentation of the thesis. Presentation of conclusions, summary. Thesis defense. Discussion on the thesis subject	8

Student workload - forms of activity		*Number of hours*
A-SD-1	Presence on lectures	45
A-SD-2	Preparations of the thesis plan	4
A-SD-3	Preparations of the reference list	4
A-SD-4	Preparations of the equations, tables and figures	4
A-SD-5	Preparation and delivering of the speech on any topic	15
A-SD-6	Preparation of the paper on the thesis topic	10
A-SD-7	Preparation of the references	2
A-SD-8	Preparation of the table of content and index, tables and figures indexes	5

Teaching methods / tools	
M-1	Lecture
M-2	Classes - seminar

Evaluation methods (F - progressive, P - final)		
S-1	F	Discussion and potential correction of the proposed arrangements, test range and references
S-2	P	Assessment of delivered paper end thesis presentation

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_A/A/06b_W01 Acquired the knowledge on basic issues in the major and thesis subject	B-A_2A_W01 B-A_2A_W02 B-A_2A_W05 B-A_2A_W06 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
CE_2A_A/A/06b_W02 Acquired knowledge on data research and source materials	B-A_2A_W01 B-A_2A_W02 B-A_2A_W05 B-A_2A_W06	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
CE_2A_A/A/06b_W03 Can prepare and deliver the speech and presentation on the chosen specialty	B-A_2A_W01 B-A_2A_W02 B-A_2A_W05 B-A_2A_W06	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
Skills							
CE_2A_A/A/06b_U01 Can choose proper tools for solving issues meet during thesis preparation by using information technologies	B-A_2A_U01 B-A_2A_U02 B-A_2A_U03	P7S_UK		C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
CE_2A_A/A/06b_U02 Solves basic problems of concrete technology and designing of concrete structures	B-A_2A_U11 B-A_2A_U12 B-A_2A_U13 B-A_2A_U18	P7S_UK P7S_UO P7S_UW_TA21 P7S_UW_TA22 P7S_UW_TA23 P7S_UW_TA24		C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
CE_2A_A/A/06b_U03 Can on one’s own describe and deliver the issues regarding thesis	B-A_2A_U11 B-A_2A_U12 B-A_2A_U15 B-A_2A_U18	P7S_UK P7S_UO P7S_UW_TA21 P7S_UW_TA24		C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
Other social / personal competences							
CE_2A_A/A/06b_K01 Can formulate thesis arrangement, prepare the tasks and assumptions	B-A_2A_K01 B-A_2A_K02 B-A_2A_K03 B-A_2A_K04 B-A_2A_K05 B-A_2A_K06 B-A_2A_K07 B-A_2A_K08	P7S_KK P7S_KO P7S_KR		C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
CE_2A_A/A/06b_K02 Can accomplish the thesis assumptions and prognoses the results including environmental effects	B-A_2A_K01 B-A_2A_K02 B-A_2A_K03 B-A_2A_K04 B-A_2A_K05 B-A_2A_K06 B-A_2A_K07 B-A_2A_K08	P7S_KK P7S_KO P7S_KR		C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2
CE_2A_A/A/06b_K03 Can evaluate the results of one’s own work and draw the conclusions	B-A_2A_K01 B-A_2A_K02 B-A_2A_K03 B-A_2A_K04 B-A_2A_K05 B-A_2A_K06 B-A_2A_K07 B-A_2A_K08	P7S_KK P7S_KO P7S_KR		C-1 C-2 C-3 C-4	T-SD-1 T-SD-6 T-SD-2 T-SD-7 T-SD-3 T-SD-8 T-SD-4 T-SD-9 T-SD-5 T-SD-10	M-1 M-2	S-1 S-2

Required reading
1. Muni Budhu, Soil Mechanics, Wiley And Shon, 2008, 8

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Diploma Seminar - prof. Meyer**		
Code	WBIA/S2CE/A/06-3		
Field of specialisation			
Administering faculty	Katedra Geotechniki		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives	6	*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
diploma/thesis seminars	SD	3	45	3,0	1,00	credits

Leading teacher	Meyer Zygmunt (Zygmunt.Meyer@zut.edu.pl)
Other teachers	Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl)

Prerequisites

W-1	Completed all subjects in the field of the studied specialty

Module/course unit objectives

C-1	Learning the principles of writing plans and the content of diploma theses in the field of soil mechanics
C-2	Acquisition of the ability to prepare presentations in the thesis of the MA thesis

Course content divided into various forms of instruction		*Number of hours*
T-SD-1	Basic knowledge about the preparation of the master thesis in relation to issues of soil mechanics	5
T-SD-2	Discussing editorial rules and the structure of the diploma thesis	5
T-SD-3	Catalog methods for organizing the collected materials for the diploma thesis, selection of sources, creating notes, list of literature	5
T-SD-4	Presentation by selected students of topics expanding knowledge of soil mechanics	10
T-SD-5	Presentation by the students of the realized parts of the Master's thesis, discussions related to the subject of the presented theses	15
T-SD-6	Preparation for printing and defense of thesis diploma thesis. Discussion of the rules regarding detailed editorial requirements, how to provide content and how to present the work	5

Student workload - forms of activity		*Number of hours*
A-SD-1	Presence at seminar	45
A-SD-2	Elaboration of master diploma thesis plan	10
A-SD-3	Preparation of the preliminary list of literature	5
A-SD-4	Student must prepare Master Thesis first presentation	10
A-SD-5	Master thesis final preparation and presentation at seminar	20

Teaching methods / tools

M-1	Information Lecture
M-2	Case Study Lecture
M-3	Practical methods- presentation

Evaluation methods (F - progressive, P - final)

S-1	F	Continuous rating of work progress
S-2	P	Final presentation rating

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

B-A_2A_A/A/06d_W01 Has knowledge related to the basic issues of the chosen specialty, standards and standards. He knows how to present a presentation on the results of the engineering task	B-A_2A_W01 B-A_2A_W02 B-A_2A_W05 B-A_2A_W06 B-A_2A_W13 B-A_2A_W15	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-SD-1 T-SD-4 T-SD-2 T-SD-5 T-SD-3 T-SD-6	M-1 M-2 M-3	S-1 S-2
Skills							
B-A_2A_A/A/06d_U01 Has the ability to obtain information from literature, formulate hypotheses and prepare and report solutions for the diploma thesis as well as obtain software supporting the organization of the construction process	B-A_2A_U01 B-A_2A_U02 B-A_2A_U03 B-A_2A_U04 B-A_2A_U05 B-A_2A_U09 B-A_2A_U11 B-A_2A_U12 B-A_2A_U18 B-A_2A_U19 B-A_2A_U22	P7S_UK P7S_UO P7S_UU P7S_UW_TA21 P7S_UW_TA24	P7S_UW_IA21	C-1 C-2	T-SD-1 T-SD-4 T-SD-2 T-SD-5 T-SD-3 T-SD-6	M-1 M-2 M-3	S-2
Other social / personal competences							
B-A_2A_A/A/06d_K01 He is aware of the responsibility for his own work and team and understands the need to learn throughout life	B-A_2A_K01 B-A_2A_K02 B-A_2A_K03 B-A_2A_K05 B-A_2A_K06 B-A_2A_K07 B-A_2A_K08	P7S_KK P7S_KO P7S_KR		C-1 C-2	T-SD-1 T-SD-4 T-SD-2 T-SD-5 T-SD-3 T-SD-6	M-1 M-2 M-3	S-1 S-2

Required reading

1. Muni Budhu, Soil Mechanics, Wiley And Shon, 2008, 8

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Mathematics**		
Code	WBIA/S2CE/B/01		
Field of specialisation			
Administering faculty	Studium Matematyki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecturing course	A	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Bohonos Adam (Adam.Bohonos@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Knowledge of selected topics of higher mathematics from the courses Mathematics-1 and Mathematics-2 from the 1-st degree studies at Construction and Architecture Faculty

Module/course unit objectives	
C-1	To give the students an extended and deepened knowledge of higher mathematics
C-2	To teach the students methods and computational algorithms used in engineering
C-3	To educate the students about the necessity of whole life learning and responsibility for a reliable work

Course content divided into various forms of instruction		*Number of hours*
T-A-1	Basic information from the integral calculation: Integration by parts and Integration by substitution and partial derivative of the function of two or more variables.	2
T-A-2	Solving ordinary differential equations of higher orders	3
T-A-3	Solving partial differential equations of the second order using canonical form	4
T-A-4	Expansion of a periodic function into Fourier series	4
T-A-5	Test	2
T-W-1	Ordinary differential equations of higher order	3
T-W-2	Partial differential equation of second order, types: parabolic, hyperbolic and elliptic - elementary course.	4
T-W-3	Function series: power series and Fourier series of a periodic function	4
T-W-4	Fourier transform	2
T-W-5	Test	2

Student workload - forms of activity		*Number of hours*
A-A-1	Taking part in exercises, solving of exercises and analyzing problems under supervision of a teacher	13
A-A-2	Self study by solving exercises and analyzing problems	5
A-A-3	Test preparration	10
A-A-4	Test	2
A-W-1	Taking part in lectures and making notes	13
A-W-2	Independent reading of lecture notes and studying literature	7
A-W-3	Exam praparation	8
A-W-4	Exam	2

Teaching methods / tools	
M-1	A lecture with explanations and numerous examples
M-2	Exercises - solving exercises and problems concerning topic of the lecture

Evaluation methods (F - progressive, P - final)		
S-1	F	Valuation of students activity during lectures and exercises
S-2	P	Exercises - a test of computational exercises
S-3	P	Exercises - a test of thoretical questions

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/B/01-1_W01 The student knows the basic definitions, theorems, examples and computational methods of selected topics of higher mathematics	B-A_2A_W01	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3	M-1 M-2	S-1 S-2 S-3
Skills							
B-A_2A_A/B/01-1_U01 The student is able to solve mathematical problems appearing in engineering praxis correctly and precisely	B-A_2A_U01 B-A_2A_U10	P7S_UK P7S_UW_TA21	P7S_UW_IA21	C-1 C-2	T-A-1 T-A-4 T-A-2 T-A-5 T-A-3	M-1 M-2	S-1 S-2 S-3
Other social / personal competences							
B-A_2A_A/B/01-1_K01 The student is aware of necessity of the whole life learning and responsibility for a reliable work	B-A_2A_K02	P7S_KK		C-3	T-A-1 T-W-1 T-A-2 T-W-2 T-A-3 T-W-3 T-A-4 T-W-4 T-A-5 T-W-5	M-1 M-2	S-1 S-2

Required reading

1. Tyn Myint-U, Lokenath Debnath, Linear Partial Differential Equations for Scientists and Engineers, Birkhauser, 4

2. K. Weltner, J. Grosjean, W. J. Weber, P. Schuster, Mathematics for Physicists and Engineers, Springer, 2009

Supplementary reading

1. Donald A.McQuarrie, Mathematical Methods for Scientists and Engineers, Univ Science Books, 2003

3. Donald A. McQuarrie, Mathematical Methods for Scientists and Engineers part 2, Univ Science Books, 2003

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Complex Concrete Structures**		
Code	WBIA/S2CE/A/C/01		
Field of specialisation			
Administering faculty	Katedra Konstrukcji Żelbetowych i Technologii Betonu		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,5	0,50	credits
lecture	W	1	15	1,5	0,50	examination

Leading teacher	Kiernożycki Włodzimierz (Wlodzimierz.Kiernozycki@zut.edu.pl)
Other teachers	Brzozowski Piotr (Piotr.Brzozowski@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Zielinski Adam (Adam.Zielinski@zut.edu.pl)

Prerequisites

W-1	Graduating major of any specialty in Civil Engineering as full-time or extramural studies

Module/course unit objectives

C-1	Ability to design complex pre-stressed structures

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of pre-stressed or post-tensioned girder: Selection of the cross-section, tendons and stressing force. Evaluating of ultimate limit state and cracking resistance. Girder design drawings	15
T-W-1	Idea of stressing and tensioning of structures and solutions: post-tensioned and pre-stressed concrete	2
T-W-2	Materials used in pre-stressed and post-tensioned structures: concrete, pre-stressing steel, tendons, stressing equipment	3
T-W-3	Calculation conditions, strain limiting, loss in pre-stressing force, ultimate limit state, resistance to cracking and deflection	5
T-W-4	Pre-stressed and post-tensioned girders, design rules, marking out of tendons, examples	3
T-W-5	Cylindrical pre-stressed concrete tanks	1
T-W-6	Design of pre-stressed or post-tensioned girder: Selection of the cross-section, tendons and stressing force. Evaluating of ultimate limit state and cracking resistance. Girder design drawings	1

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	15
A-P-2	Participation in consultations	2
A-P-3	Individual preparation of design assignment	20
A-P-4	Preparation for grading	7
A-P-5	Controlled Assessment	1
A-W-1	Participation in lectures	15
A-W-2	Lecture preparation – literature study	25
A-W-3	Taking an exam	5

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Passing the controlled assignment
S-2	P	Passing the work assigned to home

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_CE/C/02_W01 Understands the aim of using active reinforcement in pre-stressed and post-tensioned structures	B-A_2A_W05 B-A_2A_W06 B-A_2A_W08 B-A_2A_W10	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1	S-1
Skills							
CE_2A_CE/C/02_U01 Student presents unclear data, unfinished solutions, follows the work ethics	B-A_2A_U08 B-A_2A_U10 B-A_2A_U15 B-A_2A_U21 B-A_2A_U22	P7S_UW_TA21 P7S_UW_TA24	P7S_UW_IA21 P7S_UW_IA24	C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-2	S-2
Other social / personal competences							
CE_2A_CE/C/02_K01 Has awareness of the need for individual studying and upgrading professional skills	B-A_2A_K01 B-A_2A_K06	P7S_KK P7S_KR		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1 M-2	S-1 S-2

Required reading

1. Giandomenico Toniolo, Marco di Prisco, Michele Win Tai Mak, Reinforced Concrete Design to Eurocode 2, Springer Verlag GmbH, 2017
2. W.H. Mosley, Reinforced Concrete Design, PALGRAVE MACMILLAN, 2012
3. Millais, Malcolm, Building structures : from concepts to design, Spon Press, New York, 2005
4. MacGregor, James Grierson, Reinforced concrete : mechanics and design, Pearson Prentice Hall, 2006
5. A. M. Neville, Properties of concrete, London, 2011
6. Starosolski W., Konstrukcje żelbetowe, według EC2 t. I-V, PWN, Warszawa, 2011
7. EN 1992-1-1, Eurocode2 :Design of concrete structures - Part 1-1:General rules and rules for buildings, 2010
8. EN 1992-3, Eurocode 2 - Design of conrete structures - Part 3: Liquid retainig and containment structures, 2006

Supplementary reading

1. EN 1990, Eurocode - Basic of structural design, 2002

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Complex Metal Structures**		
Code	WBIA/S2CE/A/C/02		
Field of specialisation			
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,5	0,50	credits
lecture	W	1	15	1,5	0,50	examination

Leading teacher	Wróblewski Tomasz (Tomasz.Wroblewski@zut.edu.pl)
Other teachers	Abramowicz Małgorzata (Malgorzata.Abramowicz@zut.edu.pl), Paczkowski Wiesław (Wieslaw.Paczkowski@zut.edu.pl), Pełka-Sawenko Agnieszka (Agnieszka.Pelka-Sawenko@zut.edu.pl)

Prerequisites

W-1	Knowledge of the main mechanical and technological properties of steel and aluminum alloys and the basic range of steel products; ability to design and construct simple steel elements (beams, columns, bearings); knowledge of the basic design principles of steel halls.

Module/course unit objectives

C-1	Ability to design complex metal structures

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of single-shell steel smoke chimney or vertical-cylindrical tank for liquid fuels. Evaluating of the limit states and drawings preparation (assembly, workshop section, selected construction and assembly details)	15
T-W-1	Fracture and Fatigue Control in Steel Structures	5
T-W-2	Steel shell structures: chimneys, tanks - basic principles of calculation and construction. Non-technical aspects of the design and construction of steel structures	10

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	15
A-P-2	Individual preparation of design assignment	28
A-P-3	Controlled assessment	2
A-W-1	Participation in lectures	15
A-W-2	Lecture preparation - literature study	25
A-W-3	Taking an exam	5

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Passing the controlled assignment
S-2	P	Passing the exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

CE_2A_A/C/03_W01 The student is able to distinguish and define forms of destruction of steel construction elements. The student is able to define types of steel shell constructions and propose their correct construction solutions using appropriate standards and technical standards.	B-A_2A_W08 B-A_2A_W10	P7S_WG_TA21	P7S_WG_IA21	C-1	T-P-1 T-W-2 T-W-1	M-1 M-2	S-1 S-2
Skills							
CE_2A_A/C/03_U01 The student can use selected CAD programs to compile technical documentation of simple and complex steel shell structures. The student is able to design steel structures in accordance with a predefined specification.	B-A_2A_U08 B-A_2A_U14 B-A_2A_U22	P7S_UW_TA24	P7S_UW_IA24	C-1	T-P-1	M-2	S-1
Other social / personal competences							
CE_2A_A/C/03_K01 Student has awareness of the need for individual studying and upgrading professional skills	B-A_2A_K02 B-A_2A_K03	P7S_KK		C-1	T-P-1 T-W-2 T-W-1	M-2	S-1

Required reading

1. Darko Beg, Ulrike Kuhlmann, Laurence Davaine, Benjamin Braun, Design of Plated Structures: Eurocode 3: Design of Steel Structures, Part 1-5: Design of Plated Structures, Wiley, Berlin, 2010

Supplementary reading

1. Michel Bruneau, Chia-Ming Uang, Andrew Whittaker, Ductile design of steel structures, McGraw Hill Professional, Boston, 1998

2. Leroy Gardner and David A. Nethercot, Designers’ guide to Eurocode 3 : design of steel buildings : EN 1993-1-1, -1-3 and -1-8, ICE Publishing, London, 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Structural Dynamics**		
Code	WBIA/S2CE/A/C/03		
Field of specialisation			
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,5	0,50	credits
lecture	W	2	30	1,5	0,50	examination

Leading teacher	Iwankiewicz Radosław (riwankiewicz@zut.edu.pl)
Other teachers	Weber Hanna (Hanna.Weber@zut.edu.pl)

Prerequisites	
W-1	Mathematics courses pertinent to BSc in Engineering degree course
W-2	Structural Mechanics

Module/course unit objectives	
C-1	Capability to write down the equations of motion of single- and multi-degree-of-freedom linear systems with the aid of Newton'second law, the principle of angular momentum and Lagrange's equations as well as capability to determine the natural frequency of single-degree-of-freedom systems.
C-2	Capability to formulate and solve the eigenvalue problem (to determine the natural frequencies and eigenvectors) for multi-degree-of-freedom systems.
C-3	Capability to determine the forced vibration response of single- and multi-degree-of-freedom linear systems to harmonic and some non-periodic excitations.
C-4	Capability to formulate the buckling problem and to determine the critical load for rods (columns) with different boundary conditions and for simple plane frames.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Example problems: derivation of equations of motion of SDOF systems, determination of natural frequency.	2
T-P-2	Example problems: derivation of equations of motion of MDOF systems.	3
T-P-3	Solving eigenvalue problem for MDOF systems, determination of natural frequencies and eigenvectors.	5
T-P-4	Determination of amplitudes of steady-state response of a MDOF system to harmonic excitation.	1
T-P-5	Determination of critical load for rods (columns) with different boundary conditions and for simple plane frames.	4
T-W-1	Degrees of freedom and generalized co-ordinates. Constraints and their combinations. Equations of motion: Newton'second law and principle of angular momentum. Oscillatory motions and their superposition.	3
T-W-2	Single-degree-of-freedom (SDOF) systems: equation of motion, undamped and damped free vibrations. Forced vibrations: harmonic excitation, excitation due to rotating unbalance, base motion excitation, non-periodic excitations.	6
T-W-3	Lagrange's equations.	2
T-W-4	Multi-degree-of-freedom (MDOF) systems: equations of motion, eigenvalue problem (eigenvalues, natural frequencies, eigenvectors), damping hypotheses. Forced vibrations: direct approach and modal transformation technique for harmonic excitation.	8
T-W-5	Transverse vibrations of a beam: equation of motion, eigenvalue problem (eigenvalues, natural frequencies, eigenfunctions – normal modes), different boundary conditions.	3
T-W-6	Stability of equilibrium positions.	3
T-W-7	Structural stability: buckling of elastic rods (columns), buckling of plane frames (displacement method approach).	5

Student workload - forms of activity		*Number of hours*
A-P-1	Attending the example classes.	15

Student workload - forms of activity		*Number of hours*
A-P-2	Private (home) study.	20
A-P-3	Home assignments (two major assignments).	10
A-W-1	Attending the lectures.	30
A-W-2	Private (home) study.	10
A-W-3	Studying/revision for the final exam.	5

Teaching methods / tools	
M-1	Lectures.
M-2	Solving problems and home assignments.

Evaluation methods (F - progressive, P - final)		
S-1	P	Final exam mark.
S-2	F	Assessment of home assignments.

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/C/04_W01 Student should be able to develop simple mathematical models for vibration analysis and to formulate the buckling problems.	B-A_2A_W01	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3 C-4	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-P-4 T-W-5 T-P-5 T-W-6 T-W-1 T-W-7	M-1 M-2	S-1 S-2
Skills							
B-A_2A_A/C/04_U01 Student should be able to solve numerically the eigenvalue problems and equations of motion in vibration problems. He/she should also be able to solve the equations governing the buckling problems.	B-A_2A_U01	P7S_UK		C-1 C-2 C-3 C-4	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-P-4 T-W-5 T-P-5 T-W-6 T-W-1 T-W-7	M-1 M-2	S-1 S-2
Other social / personal competences							
B-A_2A_A/C/04_K01 Student shows the capability to make a plan for an undertaken research/computational project, to execute it and to observe deadlines.	B-A_2A_K01	P7S_KK		C-1 C-2 C-3 C-4	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-P-4 T-W-5 T-P-5 T-W-6 T-W-1 T-W-7	M-1 M-2	S-1 S-2

Required reading

1. W.C. Hurty and M.F. Rubinstein, Dynamics of Structures, Englewood Cliffs: Prentice Hall, 1964

2. S.S. Rao, Mechanical Vibrations, Addison-Wesley, 1995, 3rd edition

3. C.F. Beards, Engineering Vibration Analysis with Application to Control Systems, Edward Arnold, 1995

4. M. Geradin, D.Rixen, Mechanical Vibrations. Theory and Application to Structural Dynamics, J. Wiley, 1994

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Special Foundations**		
Code	WBIA/S2CE/A/C/04		
Field of specialisation			
Administering faculty	Katedra Geotechniki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Soil mechanics
W-2	Engineering geology
W-3	Foundation design

Module/course unit objectives	
C-1	Create an ability to recognize and use of proper foundation in case of massive construction and complex load systems
C-2	Create an ability to prepare a geotechnical design of special foundation

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of special foundation in complex geotechnical conditions	15
T-W-1	Advanced geotechnical aspects in special foundation design	1
T-W-2	Load transfer mechanism in pile, pier and shaft foundation	2
T-W-3	Meyerhof's method for bored and displacement driven piles	1
T-W-4	"Alpha", "lambda" and "betha" methods for shafts and piers	1
T-W-5	Elastic foundation	2
T-W-6	Test loads, Davisson formulae	1
T-W-7	Negative skin friction, neutral depth (Vesic, Bowles)	1
T-W-8	Group of piles, drilled shafts - technology and design	1
T-W-9	Brich Hansen method for lateral loading (free and fixed head)	1
T-W-10	Soil spring idealization, elastic continuum model (Poulos, Reese and Matlock, Broms approaches)	2
T-W-11	Anchoring systems in special foundation design	2

Student workload - forms of activity		*Number of hours*
A-P-1	presence on project classes	15
A-P-2	single-handed work on design project task	10
A-P-3	consultances	2
A-P-4	preparation for project completion, correction of calculation and drawings mistakes	3
A-P-5	completion of project classes	1
A-W-1	presence on lectures	15
A-W-2	self search for solutions of foundations design items given during lectures	3
A-W-3	search for optimal methods of foundations design after lectures and with literature studies	3
A-W-4	przeprowadzenie analizy porównawczej wybranych metod posadowienia w czasie konsultacji	4
A-W-5	preparation for lectures completion	5

Student workload - forms of activity		Number of hours
A-W-6	completion of lectures	1

Teaching methods / tools	
M-1	Project based learning method
M-2	Lecture, case studies

Evaluation methods (F - progressive, P - final)		
S-1	F	Project work
S-2	F	continuous assessment
S-3	P	Project presentation and defence

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/C/05_W01 Student knows systems of modern foundations design in case of not standard construction	B-A_2A_W08	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-6 T-W-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-4 T-W-10 T-W-5 T-W-11	M-1 M-2	S-1 S-2 S-3
Skills							
B-A_2A_A/C/05_U01 Student is able to: analyze geotechnical solutions for various special foundations, provide comparative analysis for given solutions, make calculations of bearing capacity of a special foundation	B-A_2A_U15 B-A_2A_U20	P7S_UW_TA24		C-1 C-2	T-P-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-4 T-W-10 T-W-5 T-W-11 T-W-6	M-1 M-2	S-1 S-2 S-3
Other social / personal competences							
B-A_2A_A/C/05_K01 Student is able in both professional and responsible way use gained knowledge and skills in executions works associated with special foundations engineering. Understands the engineering activities effect on environment	B-A_2A_K03	P7S_KK		C-1 C-2	T-P-1 T-W-6 T-W-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-4 T-W-10 T-W-5 T-W-11	M-1 M-2	S-1 S-2 S-3

Required reading

1. Bowles J. E., Foundation Analysis and Design, McGraw-Hill, 1996, Knovel Release Date 2007-01-02
2. Budhu M., Soil Mechanics and Foundations, John Wiley & Sons, 2007, Knovel Release Date: Aug 5, 2009, Earth Sciences
3. Cashman P. M., Preene M., Groundwater Lowering in Construction. A practical guide, Spon Press, London, New York, 2001
4. Cernica J. N., Geotechnical Engineering: Foundation Design, John Wiley & Sons, New York, 1995
5. Day R. W., Foundation Engineering Handbook - Design and Construction with the 2006 International Building Code, McGraw-Hill, 2006, Knovel Release Date: 2006-08-09
6. Monahan E. J., Construction of Fills, John Wiley & Sons, 1994, 2, Knovel Release Date: 2007-08-22
7. Smith I., Smith's Elements of Soil Mechanics. 8th Edition. Design to Eurokode 7, Blackwell Publishing, Oxford, 2006, 8, VIII-114
8. Tomlinson M. J., Foundation Design and Construction, Prentice Hall, Harlow, 2001, 7
9. Venkatramaiah C., Geotechnical Engineering, John Wiley & Sons, 1993

Supplementary reading

1. De Cock F., Legrand C. (Eds.), Design of Axially Loaded Piles. European Practice, A. A. Balkema, Rotterdam, 1997
2. Simons N., Memzis B., A Short Course in Foundation Engineering, Thomas Telford, London, 2000

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Computer Methods**		
Code	WBIA/S2CE/A/C/05		
Field of specialisation			
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Silicka Ewa (Ewa.Silicka@zut.edu.pl)
Other teachers	Silicka Ewa (Ewa.Silicka@zut.edu.pl)

Prerequisites

W-1	Passed course of mathematic.

Module/course unit objectives

C-1	Acquaintance with popular numerical methods according to static analysis of engineering structures.
C-2	Ability to proper numerical definiton and analysis of engineering structures by commercial systems.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Analysis of plate bar system by matrix displacement methods.	4
T-P-2	Analysis of plate stress structure by ARSA system. Influence of mesh on results improvement.	2
T-P-3	Static analysis of plate by ARSA system and finite-difference method. Comparison of results.	3
T-P-4	Static analysis of plate stress structure by finite elements method.	4
T-P-5	Test.	2
T-W-1	Revision of the matrix displacement method	5
T-W-2	Static analysis of plates by finite-difference method	1
T-W-3	Static linear analysis of bars, plates, shells and solids elements by finite element method	9

Student workload - forms of activity		*Number of hours*
A-P-1	Presents on laboratory tutorials.	15
A-P-2	Prepering to laboratory tutorials.	8
A-P-3	Revision to test.	8
A-W-1	Presence on lectures	15
A-W-2	Individual study	8
A-W-3	Resivion of presented problems	8

Teaching methods / tools

M-1	Lectures
M-2	Laboratory tutorials

Evaluation methods (F - progressive, P - final)

S-1	F	Mark of the final test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

B-A_2A_A/C/07_W01 Knows and understands algorithms of popular numerical methods in accordance to linear static analysis of engineering structures.	B-A_2A_W04	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1 T-W-3 T-W-2	M-1	S-1
Skills							
B-A_2A_A/C/07_U01 Is able to define and analize simple structures with the use of commercial systems.	B-A_2A_U17	P7S_UW_TA24		C-1 C-2	T-P-1 T-P-4 T-P-2 T-P-5 T-P-3	M-2	S-1
Other social / personal competences							
B-A_2A_A/C/07_K01 Understands responsibility for the profesionally made calculations.	B-A_2A_K02	P7S_KK		C-1 C-2	T-P-1 T-P-3 T-P-2 T-P-4	M-2	S-1

Required reading

1. Cook R. D., Malkus D. S., Plesha M. E., Witt R. J., Concepts and Applications of Finite Element Analysis, Wiley, 2002

2. Desei C. S., Abel J. F., Introduction to the Finite Element Method, VNR, New York

3. Zienkiewicz O. C., The Finite Element Method in Engineering Science, McGraw-Hill, London

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Basics of Scientific Information - Training**		
Code	WBiA/S2CE/W01		
Field of specialisation			
Administering faculty	Katedra Geotechniki		
ECTS	0,0	*ECTS (forms)*	0,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	3	2	0,0	1,00	credits

Leading teacher	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	basics of computer use and internet

Module/course unit objectives

C-1	Student knows the main sources of search the books and other sources of needed information.

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Library system at ZUT, sources scientific information, Knovel base, licensed bases, logins, passwords, books exchange between libraries, bibligraphy, practical advises for search the information in data bases	2

Student workload - forms of activity — *Number of hours*

Teaching methods / tools

M-1	Lecture

Evaluation methods (F - progressive, P - final)

S-1	F	presence on lecture

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_B-A/W01_W01 Student knows bases and information services, library catalogues to search for materials for diploma thesis. Is aware to follow ethic rules in research and knows copyright law principles.	B-A_2A_W15	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1	M-1	S-1
Skills							
B-A_2A_B-A/W01_U01 Student is able to choose relevant electronic bases and information services, library catalogues to find materials to prepare diploma thesis.	B-A_2A_U01	P7S_UK		C-1	T-W-1	M-1	S-1
Other social / personal competences							
B-A_2A_B-A/W01_K01 Student is able to use information environment of scientific data bases, understands ethic aspects and copyright law.	B-A_2A_K06 B-A_2A_K07	P7S_KR		C-1	T-W-1	M-1	S-1

Required reading

1. Olivier L. de Weck, Daniel Roos, and Christopher L. Magee, Engineering Systems Meeting Human Needs in a Complex Technological World, The MIT Press Cambridge, Massachusetts, London, England, 2011

2. M. Raman, S. Sharma, Technical Communication Principles and Practice, Oxfor University Press, Oxford, 2015, 3rd

Supplementary reading

1. Kenneth G. Budinski, Preparing and Delivering Technical Presentations, ASTM International, 2006

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Practical Placement - 4 weeks**		
Code	WBiA/S2CE/P/01		
Field of specialisation			
Administering faculty	Dziekanat		
ECTS	1,0	*ECTS (forms)*	1,0
Form of course credit	credits	*Language*	polish
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Weeks*	*ECTS*	*Weight*	*Credit*
	PR	2	4	1,0	1,00	credits

Leading teacher	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)
Other teachers	SSB Prodziekan (Prodziekan.SSB@zut.edu.pl)

Prerequisites

W-1	Actual insurance and current medical examinations with an entry about the possibility of working at heights

Module/course unit objectives

C-1	Practical observation and participation of the implementation of individual stages of the investment process in construction

Course content divided into various forms of instruction		*Number of weeks*
T-PR-1	Practical placement carried out in: design office, construction company, relevant offices, laboratories - completed with the development of a report on internships. Industrial safety measures, individual and staff safety.	4

Student workload - forms of activity		*Number of hours*
A-PR-1	Practical placement in company. Safety measures training.	10
A-PR-2	Preparing report on internship	10
A-PR-3	Completion on practical placement with prepared report	4
A-PR-4	Preparation to pass the module	7

Teaching methods / tools

M-1	practical method

Evaluation methods (F - progressive, P - final)

S-1	P	report and discussion

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_S2B-A/P/01_W01 Student knows the standards applicable in construction and principles of building management, has knowledge about the investment process - its organization, participants and knows the basics of conducting business courage in the construction industry	B-A_2A_W11 B-A_2A_W14	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1	T-PR-1	M-1	S-1
Skills							
B-A_2A_S2B-A/P/01_U01 Student acquires the ability to read architectural drawings, construction and maps. He can prepare graphic documentation in the environment of selected CAD programmes and can organize work on a construction site in accordance with the principles of construction technology and organization	B-A_2A_U16 B-A_2A_U23	P7S_UW_TA23 P7S_UW_TA24		C-1	T-PR-1	M-1	S-1
Other social / personal competences							

B-A_2A_S2B-A/P/01_K01 Student understands the need to learn throughout life - based on the observation of the construction work, the design office. He is responsible for his own and team's security. He is aware of the responsibility for his own work and readiness to comply with the principles of teamwork and taking responsibility for the tasks he or she has carried out jointly. Is aware of the importance of behavior in a professional manner and compliance with the rules of professional ethics	B-A_2A_K06	P7S_KR		C-1	T-PR-1	M-1	S-1

Required reading

1. Documentation of building site

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Theory of Constructions**		
Code	WBIA/S2CE/ES/D/01-1		
Field of specialisation	Engineering Structures		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
laboratory course	L	1	15	1,0	0,34	credits
project course	P	1	15	1,0	0,33	credits
lecture	W	1	15	1,0	0,33	credits

Leading teacher	Weber Hanna (Hanna.Weber@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Mathematics
W-2	Physics
W-3	Structural Mechanics
W-4	Numerical Methods

Module/course unit objectives	
C-1	Knowledge in the field of Statics and limit states of continuous bars.
C-2	Ability to construct influence lines and moment envelope in continuous beams.
C-3	Ability to consider the beams on flexible ground.
C-4	Ability to consider Statics of cables and chains.
C-5	Ability to solve the problems of limit states of bar systems.

Course content divided into various forms of instruction		*Number of hours*
T-L-1	Plane state of stress	3
T-L-2	Torsion of thin-walled cross-section	3
T-L-3	Observation and visualization of vibrations	3
T-L-4	Elastic buckling of bar	2
T-L-5	Influence lines of continuous beam.	2
T-L-6	Stretching of non-symmetrical thin-walled cross-section	2
T-P-1	Influence lines of continuous beams.	5
T-P-2	Beams on flexible ground.	5
T-P-3	Limit states of beams and frames	5
T-W-1	Static indeterminate continuous beams, influence lines.	3
T-W-2	Cables and chains	2
T-W-3	Beams on flexible ground	4
T-W-4	Limit states of beams and frames	6

Student workload - forms of activity		*Number of hours*
A-L-1	Attending the laboratory classes.	15
A-L-2	Preparation for laboratory classes	15
A-P-1	Attending the project classes	15
A-P-2	Preparation for project classes	5

Student workload - forms of activity		*Number of hours*
A-P-3	Execution of project assignment	10
A-W-1	Attending the lectures.	15
A-W-2	Studying/revision for the final exam.	13
A-W-3	Participation in the exam.	2

Teaching methods / tools	
M-1	Lecture
M-2	Project class
M-3	Laboratory class

Evaluation methods (F - progressive, P - final)		
S-1	P	Written exam
S-2	F	Assesment of project assignment
S-3	F	Assesment during the laboratory classes

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/C/01_W01 Student knows how to create numerical models for static indeterminate bar systems with permanent and live loads.	B-A_2A_W05	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-3 T-W-2 T-W-4	M-1	S-1
Skills							
B-A_2A_A/C/01_U01 Student is able to create numerical and measuring models in accordance with the addressed problem	B-A_2A_U19	P7S_UW_TA24		C-2 C-3 C-4 C-5	T-L-1 T-P-2 T-L-2 T-P-3 T-L-3 T-W-1 T-L-4 T-W-2 T-L-5 T-W-3 T-L-6 T-W-4 T-P-1	M-1 M-2 M-3	S-1 S-2 S-3
Other social / personal competences							
B-A_2A_A/C/01_K01 Student is aware of responsibility for his computation	B-A_2A_K02	P7S_KK		C-2 C-3 C-4 C-5	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-W-1	M-1 M-2	S-1 S-2

Required reading
1. Kenneth M. Leet, Chia-Ming Uang, Anne M. Gilbert, Fundamentals of Structural Analysis, McGraw-Hill, 2011, Fourth edition
2. Jacques Heyman, Elements of the theory of Structures, Cambridge University Press, 1996

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Computer Aided Design-2**		
Code	WBIA/S2CE/ES/D/08-2		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Konstrukcji Żelbetowych i Technologii Betonu		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	30	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Brzozowski Piotr (Piotr.Brzozowski@zut.edu.pl)
Other teachers	Kacprzak Dominik (Dominik.Kacprzak@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Graduating major of any specialty in Civil Engineering as full-time or extramural studies

Module/course unit objectives

C-1	Ability to design reinforced concrete structures using computer programs
C-2	Ability to prepare drawings and documentation of reinforced concrete structures using computer programs

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of various reinforce concrete elements using computer programs: computer models preparation, load collection, evaluating of ultimate limit state and serviceability limit states, preparation of design drawings and documentation.	30
T-W-1	Introduction to concepts of numerical methods used in calculations of reinforced concrete elemnets and structures	2
T-W-2	Introduction to the concept of preparation of engineering drawings of reinforced concrete elements and their documentation	2
T-W-3	Computer models of various reinforced concrete elements and structures	4
T-W-4	Load collection for various reinforced concrete elements and structures	2
T-W-5	Ultimate limit state and serviceability limit states in computer calculations	5

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	30
A-W-1	Participation in lectures	15
A-W-2	Lecture preparation – literature study	13
A-W-3	Taking an final test	2

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Passing the controlled assignment
S-2	P	Passing the work assigned to do at home

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

CE_2A_CE/C/08-2_W01 Understands the aim of using computer programs in design and preparations of drawings and documentation of reinforced concrete elements and structures	B-A_2A_W02 B-A_2A_W04 B-A_2A_W06 B-A_2A_W09	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-3 T-W-1 T-W-4 T-W-2 T-W-5	M-1 M-2	S-1 S-2
Skills							
CE_2A_CE/C/08-2_U01 Can prepare calculations and documentation of elements and structures using computer programs	B-A_2A_U08 B-A_2A_U09 B-A_2A_U14 B-A_2A_U18 B-A_2A_U20	P7S_UW_TA21 P7S_UW_TA24	P7S_UW_IA21 P7S_UW_IA24	C-1 C-2	T-P-1 T-W-3 T-W-1 T-W-4 T-W-2 T-W-5	M-1 M-2	S-1 S-2
Other social / personal competences							
CE_2A_CE/C/08-2_K01 Has awareness of the need for individual studying and upgrading professional skills	B-A_2A_K06	P7S_KR		C-1 C-2	T-P-1 T-W-3 T-W-1 T-W-4 T-W-2 T-W-5	M-1 M-2	S-1 S-2

Required reading

1. Kuang-Hua Chang, Design Theory and Methods using CAD/CAE, Elsevier, 2014

2. Rao, Singiresu S., The finite element method in engineering, Elsevier, 2011

3. various, Programs manuals and tutorials, various

Supplementary reading

1. Ning Gu, Xiangyu Wang, Computational Design Methods and Technologies: Applications in CAD, CAM and CAE Education, IGI Global, 2012

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Cost Management in Construction-1**		
Code	WBIA/S2CE/ES/D/09-1		
Field of specialisation	Engineering Structures		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Bochenek Magdalena (Magdalena.Bochenek@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Basic knowledge of construction technology and construction materials

Module/course unit objectives

C-1	Upon completion of this course the student will be able to manage the construction cost effectively and accountably

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Cost management using software	15
T-W-1	Introduction to international cost management	1
T-W-2	International best practices	2
T-W-3	Simulation techniques for cost management	3
T-W-4	Managing risks within the project cost	3
T-W-5	Value management	3
T-W-6	Cost control and monitoring procedures	3

Student workload - forms of activity		*Number of hours*
A-P-1	Class Participation	15
A-P-2	Exercise preparation	15
A-W-1	Class Participation	15
A-W-2	Independent analysis of lecture content and literature recognition	7
A-W-3	Preparation for the exam	7
A-W-4	Final exam	1

Teaching methods / tools

M-1	Lecture, case studies

Evaluation methods (F - progressive, P - final)

S-1	F	continuous assessment
S-2	P	written exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_A/C/06_W01 Student has the knowledge of managing the construction cost effectively and accountably.	B-A_2A_W14	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1	S-1 S-2

Skills							
CE_2A_A/C/06_U01 Student is able to: analyse and control the cost for various cases.	B-A_2A_U24	P7S_UW_TA22		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-1 S-2
Other social / personal competences							
CE_2A_A/C/06_K01 Student is able in both professional and responsible way use gained knowledge and skills in executions works associated with cost management.	B-A_2A_K05	P7S_KO		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-1 S-2

Required reading

1. K. Potts, N.Ankrah, Construction cost management, Routledge, 2017

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Management of building projects**		
Code	WBIA/S2CE/ES/D/02		
Field of specialisation	Engineering Structures		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Bochenek Magdalena (Magdalena.Bochenek@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Basic knowledge of construction technology and construction materials.

Module/course unit objectives

C-1	Upon completion of this course the student will be able to recognize project management procedures along with tools used to plan, manage, organize, monitor, and control a project

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Case study: management of building project based on selected examples	15
T-W-1	Introduction and course requirements. Safety measures on building site, individual and staff safety.	1
T-W-2	Project management methodology: PRINCE2, Waterfall, and Agile	5
T-W-3	Project phases: strategy phase, planning phase, realization phase, closure phase	2
T-W-4	Mind Mapping for Project Management	2
T-W-5	CPM and CCPM methodology	3
T-W-6	Case study in project scheduling	2

Student workload - forms of activity		*Number of hours*
A-P-1	Class Participation	15
A-P-2	Exercise preparation	15
A-W-1	Class Participation	15
A-W-2	Independent analysis of lecture content and literature recognition	7
A-W-3	Preparation for the exam	7
A-W-4	Final exam	1

Teaching methods / tools

M-1	Lecture, case studies

Evaluation methods (F - progressive, P - final)

S-1	F	continuous assessment
S-2	P	final exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

CE_2A_ES/D/01_W01 Student has the knowledge of project management methodology and processes	B-A_2A_W14	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1	S-1 S-2
Skills							
CE_2A_ES/D/01_U01 Student is able to: analyze and control construction process	B-A_2A_U23	P7S_UW_TA23		C-1	T-P-1	M-1	S-1
Other social / personal competences							
CE_2A_ES/D/01_K01 Student is able in both professional and responsible way use gained knowledge and skills in executions works associated with management of building project	B-A_2A_K06	P7S_KR		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-1 S-2

Required reading

1. M.D.Alam, U.F.Guehl, Project-management in practise. A quideline and toolbox for successful projects, Springer, 2017

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Basics of Bridge Engineering**		
Code	WBIA/S2CE/ES/D/03		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Dróg i Mostów		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	30	1,5	0,44	credits
lecture	W	1	15	1,5	0,56	credits

Leading teacher	Hołowaty Janusz (Janusz.Holowaty@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Elementary structural analysis

Module/course unit objectives	
C-1	Understanding bridge structures
C-2	Simplified design of bridge members

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design standards. Initial design. Preliminary sizing - material selection.	3
T-P-2	Determination of road bridge cross section. Road data. Structural materials, pavements, kerbs, safety barriers, other fittings.	6
T-P-3	Actions and calculation of action effects - bending moments and shear forces.	6
T-P-4	Effective widths of slabs. Concrete cover. Reinforcement design for bending and shear.	5
T-P-5	General drawings of a bridge span. Reinforcemnt drawings.	8
T-P-6	Drawing of a bridge detail. Project summary.	2
T-W-1	Introdution. History of bridges. Bridge design standards and specifications.	2
T-W-2	Actions on bridges: permanent actions, variable actions and live loads. Load models.	1
T-W-3	Basic bridge types. Members in bridge structures.	2
T-W-4	Bridge geometrics. Basic bridge materials. Bridge accessories. Lecture summary I.	4
T-W-5	Analysis of bridges. Influance linesw. Computer analysis.	4
T-W-6	Bridge structural systems. Examples of bridge construction. Lecture summary II.	2

Student workload - forms of activity		*Number of hours*
A-P-1	Project attendance	30
A-P-2	Structural calculations	8
A-P-3	Structural drawings	7
A-W-1	Lecture attendance	15
A-W-2	Study of literature, standards and guides	15
A-W-3	Preparetion for lectures and checks.	12
A-W-4	Consultations	2

Teaching methods / tools	
M-1	Informative lecture
M-2	Project method

Evaluation methods (F - progressive, P - final)

Evaluation methods (F - progressive, P - final)		
S-1	F	Grading of lectures and project work
S-2	F	Execution of a bridge design project

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/02_W01 A student engineer can recognize types of bridge structures and execute basic structural calculations of bridge members.	B-A_2A_W01	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-1 T-P-2 T-W-2 T-P-3 T-W-3 T-P-4 T-W-4 T-P-5 T-W-5 T-P-6 T-W-6	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ES/D/02_U01 A student engineer is able to use basic standards and technical rules related to engineering structures.	B-A_2A_U01	P7S_UK		C-1 C-2	T-P-1 T-W-1 T-P-2 T-W-2 T-P-3 T-W-3 T-P-4 T-W-4 T-P-5 T-W-5 T-P-6 T-W-6	M-1 M-2	S-1 S-2
Other social / personal competences							
B-A_2A_ES/D/02_K01 A student engineer obtains the basis for constant learning, care for the level of executed works, compliance of professional eathics.	B-A_2A_K01	P7S_KK		C-1 C-2	T-P-1 T-W-1 T-P-2 T-W-2 T-P-3 T-W-3 T-P-4 T-W-4 T-P-5 T-W-5 T-P-6 T-W-6	M-1 M-2	S-1 S-2

Required reading

1. Troitsky M.S., Planning and Design of Bridges, John Wiley & Sons, New York - Toronto, 1994
2. Tonias D.E., Zhao J.J., Bridge Engineering, MCGrawHill, New York - London - Toronto, 2007, Second Edition
3. Bridge Design to Eurocodes. Worked Examples, JRC European Commission, European Union, 2012, JRC 68415

Supplementary reading

1. Ghosh U.K., Design and Construction of Steel Bridges, Taylor & francis, London, 2006
2. Akesson B., Understanding Bridge Collapses, Taylor & Francis, London - New York, 2008
3. Bridge Design to Eurocodes. Simplified rules for use in student project, SCI, Berkshire, 2011, RT1156

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Civil Engineering**		
Code	WBIA/S2CE/ES/D/04		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Budownictwa Ogólnego		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	30	1,5	0,50	credits
lecture	W	1	15	1,5	0,50	examination

Leading teacher	Nowak Rafał (Rafal_Nowak@zut.edu.pl)
Other teachers	Jaworski Rafał (Rafal.Jaworski@zut.edu.pl), Nowak Rafał (Rafal_Nowak@zut.edu.pl), Skibicki Szymon (Szymon.Skibicki@zut.edu.pl), Tkacz Piotr (Piotr.Tkacz@zut.edu.pl)

Prerequisites	
W-1	Strength of materials (basic)

Module/course unit objectives	
C-1	Basic knowledge of timber structural engineering
C-2	Basic knowledge of European Standards for timber structures
C-3	Basic knowledge of modern construction design principles

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design and detailing of light wood framed building with truss girder.	30
T-W-1	General design standards and procedures for timber structures. The principles of constructing light frame timber structures. Steel framed buildings as alternative to timber buildings. New types of buildings.	9
T-W-2	Construction principles of high buildings. Modern building static structural analysis.	6

Student workload - forms of activity		*Number of hours*
A-P-1	Design workshop	15
A-P-2	Individual student work	30
A-W-1	Participation in classes	15
A-W-2	Individual student work	30

Teaching methods / tools	
M-1	Lectures
M-2	Design workshop

Evaluation methods (F - progressive, P - final)		
S-1	P	Written exam
S-2	P	Project works

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/03_W01 Student knows European Standards for timber structures	B-A_2A_W08 B-A_2A_W10 B-A_2A_W11 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3	T-P-1 T-W-2 T-W-1	M-1 M-2	S-1 S-2
Skills							

B-A_2A_ES/D/03_U01 Student can set up the loading acting on structure according to European Standards. Student can design of light frame timber structure.	B-A_2A_U01 B-A_2A_U21	P7S_UK P7S_UW_TA24		C-1 C-2	T-P-1 T-W-2 T-W-1	M-2	S-2
Other social / personal competences							
B-A_2A_ES/D/03_K01 Student understand rule of design of light framed timber structures and new modern buildings.	B-A_2A_K04 B-A_2A_K06	P7S_KK P7S_KR		C-1 C-2 C-3	T-P-1 T-W-2 T-W-1	M-1 M-2	S-1 S-2

Required reading

1. Porteous, J., Kermani, A., Structural Timber Design to Eurocode 5, Blackwell Publishing, 2007
2. EN 1990: Eurocode - Basis of structural design, 2011
3. Eurocode 1: Actions of structures, parts: EN 1991-1-1; EN 1991-1-3; EN 1991-1-4, 2011
4. EN 19951-1: Eurocode 5: Design of timber structures, 2011

Supplementary reading

1. Hugues, T., Steiger L., Weber, J., Timber Construction. Details. Products. Case studies., 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Precast Concrete Structures**		
Code	WBIA/S2CE/ES/D/05		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Konstrukcji Żelbetowych i Technologii Betonu		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	0,8	0,50	credits
lecture	W	1	30	1,2	0,50	credits

Leading teacher	Horszczaruk Elżbieta (Elzbieta.Horszczaruk@zut.edu.pl)
Other teachers	Brzozowski Piotr (Piotr.Brzozowski@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Zielinski Adam (Adam.Zielinski@zut.edu.pl)

Prerequisites	
W-1	Engineering degree of any specialty in Civil Engineering as full-time or extramural studies

Module/course unit objectives	
C-1	Understands the character of structures designed with precast concrete elements
C-2	Ability to evaluate structures in terms of spatial rigidity
C-3	Ability to design and dimension precast concrete elements and their joints
C-4	Ability to design and dimension precast concrete elements and their joints

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of the inner wall plate with openings: static strength calculations for vertical and horizontal loads; analysis of strained sections; strength calculations for vertical and horizontal joints and lintel	15
T-W-1	Basic terms of precast concrete, classification of the elements	1
T-W-2	Typing and technological conditionings of designing the precast structures	2
T-W-3	Modern systems and solutions for designing building and industrial sheds	2
T-W-4	Spatial rigidity of precast structures. Static diagrams of precast solutions	2
T-W-5	Work of the stiffness in elements and reinforcement of lintels	1
T-W-6	Designing the construction for the horizontal load: determination of the loads on the stiffening, conditions for the omission of the horizontal loads and torque in the calculations; simplified models in static calculations; calculation of the inner forces in lintels and stiffening wall sections using two-beam model	10
T-W-7	Forces inside the walls due to vertical load: Load transferred from the ceiling; forces in walls due to vertical continuous and concentrated load	2
T-W-8	Bearing capacity of the wall located between the ceilings	2
T-W-9	Strained areas in the precast wall elements: Schematics and bearing capacity of horizontal joints; schematics and bearing capacity of vertical joints	4
T-W-10	Precast ceiling plates. Role of the reinforced concrete tie beams.	2
T-W-11	Examples of reinforced concrete joints in precast building frame	2

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	15
A-P-2	Individual preparation of design assignment	7
A-P-3	Preparation for grading	1
A-P-4	Controlled Assessment	1
A-W-1	Participation in lectures	30
A-W-2	Preparations for the exam	4

Student workload - forms of activity		Number of hours
A-W-3	Taking an exam	2

Teaching methods / tools	
M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)		
S-1	P	Written exam
S-2	P	Assessment of the project

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_ES/D/04_W01 Understands the conditions of the static work of structures made from precast concrete elements, including design rules of the stiffening spatial system and joint work	B-A_2A_W05 B-A_2A_W08 B-A_2A_W10	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3 C-4	T-P-1 T-W-6 T-W-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-4 T-W-10 T-W-5 T-W-11	M-1 M-2	S-1 S-2
Skills							
CE_2A_ES/D/04_U01 Can design the building frame of precast structures including spatial stiffness and effect of horizontal loads, choice of joints between the elements and preparations of design drawings	B-A_2A_U08 B-A_2A_U13 B-A_2A_U15 B-A_2A_U20 B-A_2A_U21	P7S_UO P7S_UW_TA22 P7S_UW_TA23 P7S_UW_TA24	P7S_UW_IA24	C-1 C-2 C-3 C-4	T-P-1 T-W-6 T-W-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-4 T-W-10 T-W-5 T-W-11	M-1 M-2	S-1 S-2
Other social / personal competences							
CE_2A_ES/D/04_K01 Has awareness of the need for individual studying and upgrading professional skills	B-A_2A_K06	P7S_KR		C-1 C-2 C-3 C-4	T-P-1 T-W-8 T-W-5 T-W-9 T-W-6 T-W-10 T-W-7 T-W-11	M-1 M-2	S-1 S-2

Required reading

1. Giandomenico Toniolo, Marco di Prisco, Michele Win Tai Mak, Reinforced Concrete Design to Eurocode 2, Springer Verlag GmbH, 2017
2. W H Mosley, Reinforced Concrete Design, PALGRAVE MACMILLAN, 2012
3. Millais, Malcolm, Building structures : from concepts to design, Spon Press, New York, 2005
4. MacGregor, James Grierson, Reinforced concrete : mechanics and design, Pearson Prentice Hall, 2006
5. A. M. Neville, Properties of concrete, London, 2011
6. Starosolski W., Konstrukcje żelbetowe, według EC2 t. I-V, PWN, Warszawa, 2011
7. EN 1992-1-1, Eurocode2 :Design of concrete structures - Part 1-1:General rules and rules for buildings, 2010
8. EN 1992-3, Eurocode 2 - Design of conrete structures - Part 3: Liquid retainig and containment structures, 2006

Supplementary reading

1. EN 1990, Eurocode - Basic of structural design, 2002

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Sustainable Construction**		
Code	WBIA/S2CE/ES/D/06-1		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Mieszkalnictwa i Podstaw Techniczno-Ekologicznych Architektury		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives	7	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Januszkiewicz Krystyna (Krystyna.Januszkiewicz@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl)

Prerequisites	
W-1	Intermediate skills in structural design. Basic knowledge of technical aspects such as geometry construction, material performance, MEP, law regulations. Operative in structural design programs, BIM - not necessary course programs. Basic knowledge of sustainable development and the ecological aspects of building structures.

Module/course unit objectives	
C-1	The aim of the course is to increase knowledge in structural design and the sustainable structural engineering. Sustainable Construction is the leading reference for the design, construction, and operation of high performance green buildings. With broad coverage including architecture, engineering, and construction this course delivers detailed information on all aspects of the green building process, from materials selection to building systems and more.
C-2	Additionally developing skills in implementation of digital tools during design process. Course can integrate architecture and structural engineering students.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	The task is to design a landforms, public use structural object in a municipality with an attractive landscape, located close to a large urban area, e.g. the city of Szczecin.	15
T-W-1	How currently structural engineers should incorporate sustainability concepts in their designs.	1
T-W-2	Innovative methods address the environmental impact, energy use, and other sustainability issues faced during planning and design of buildings.	1
T-W-3	Five sustainable structural design methodologies: Minimizing Material Use, Minimizing Material Production Energy, Minimizing Embodied Energy, Life-Cycle Analysis/Inventory/Assessment, and Maximizing Structural System Reuse.	1
T-W-4	Research review into the qualification and development of the sustainable properties of construction materials and methods for optimizing the environmental impact of structural design.	1
T-W-5	Curvilinear structural envelops in current building engineering and reduction wind loads.	1
T-W-6	Parametric digital tools and designing sustainable building structures.	1
T-W-7	Research review into the effect that structural form, system and magnitude have on building design relative to a structure’s overall sustainable qualities (planning, design and implementation).	1
T-W-8	The aspects of a project’s form, structural system and magnitude directly relate the issues facing both structural engineers and architects in attempts to achieve more sustainable structural designs.	1
T-W-9	Review of current Leadership in Energy and Environmental Design Green Building document’s applicability for structural system design.	1
T-W-10	Shaping complex geometry with using ESO evolutionary digital optimization tools.	1
T-W-11	Presentation and review of the role project size and material type play in structural and sustainable design.	1
T-W-12	Presentation and discussion of the role sustainability plays in three major construction materials (steel, cast-in-place reinforced concrete and prestressed/precast concrete).	1
T-W-13	Sustainable design aspect qualities by construction type (wooden structures).	1
T-W-14	Description and review of current the concept of life cycle analysis and its implication on structural design. The Structure of Production Costs in the Sustainable Development of Construction Enterprises.	1
T-W-15	Climate change adopted building structure - responsive envelopes and the future challenges.	1

Student workload - forms of activity		Number of hours
A-P-1	Participation in lectures	15
A-P-2	Project work	15
A-W-1	Participation in lectures and study required readings	15
A-W-2	Study required and selected supplementary readings	15

Teaching methods / tools	
M-1	Lectures with Power Point presentations by the subject leader. Additionally, the discussion with the current thinking on economics, climate change, net zero buildings, and more, with contributions by leader in the field that illustrate the most recent shifts in thinking and practice.

Evaluation methods (F - progressive, P - final)		
S-1	P	Evaluation grade of lectures
S-2	F	Execution of design project

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/05-1_W01 Knows technical and technological conditions of design Sustainable Constructions and their practice. Understands basic principles and spatial relations in the sustainable structural design.	B-A_2A_W02 B-A_2A_W05	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15	M-1	S-1 S-2
Skills							
B-A_2A_ES/D/05-1_U01 Is able to adjust the method to a structural design task, experiments and uses computer software. In his/her work, pursues an individual engineer attitude which is manifested through his/her approach to reality the sustainable structural design.	B-A_2A_U11 B-A_2A_U16	P7S_UK P7S_UW_TA24		C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15	M-1	S-1 S-2
Other social / personal competences							
B-A_2A_ES/D/05-1_K01 Respects and protects the integrity of the natural and cultural environment.	B-A_2A_K03	P7S_KK		C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15	M-1	S-1 S-2

Required reading

1. Januszkiewicz K. and Paszkowska N. E., Climate change adopted building envelope for the urban environment, A new approach to architectural design, Go Green, Hofburg 2-4 November Vienna 2016, 16th : International Multidisciplinary Scientific Geoconference SGEM 2016, 2016, Book 6, Nano, Bio and Green Technologies for a sustainable Future, Vol III : 515-522.

2. Kibert Ch. J., Sustainable Construction: Green Building Design and Delivery, John Wiley and Sons, London, 2016

3. Danatzko J.M., Sezen H., Sustainable Structural Design Methodologies, ASCE Library Access provided by ZUT, 2011

4. Krygiel E., Nies B., Green BIM: Successful Sustainable Design with Building Information Modeling, John Wiley and Sons, London, 2018

5. Januszkiewicz K., Shaping complex geometry with using ESO evolutionary digital optimization tools. A new approach to architectural design, International Multidisciplinary Scientific Geoconference SGEM, Albena, 2017, Vol.17, No. 62, pp. 749-756.

6. Gjorv O. E., Sakai K., Concrete Technology for a Sustainable Development in 21st Century, John Wiley and Sons, London, 2014

7. Bollinger K., Grohman M., Tessmann O., Form, Force, Performance. Multi-parametric Structural Design, AD, 2008, Vol. 78, No. 2–3, pp. 20–25.

8. Kowalski K., Januszkiewicz K., A parametric green architecture in urban space. A new approach to design environmental-friendly buildings, International Multidisciplinary Scientific Geoconference SGEM, Vienna, 2017, pp. 735-742.

9. Dh. Yeo, R. D. Gabbai, Sustainable design of reinforced concrete structures through embodied energy optimization, Energy and Buildings, Elsevier, 2011, Vol. 43, Issue 8, pp. 2028-2033.

10. Lechner N., Heating, Cooling, Lighting: Sustainable Design Methods for Architects, John Wiley & Sons, London, 2014

11. Crawford R H., Life Cycle Assessment in the Built Environment, Taylor and Francis, London, 2011

12. Pabian A., Tomski P. (ed.), Management in sustainable construction industry, Czestochowa University of Technology, Czestochowa, 2014

Supplementary reading

1. Januszkiewicz K., Glass Fiber-reinforced Concrete as a Component the non linear shaped structural envelop in Current Architecture, 11th Central European Congress on Concrete Engineering, HAINBURG (AUSTRIA), 2015, 363-366 (full version CD).

2. Januszkiewicz K., Banachowicz M., Glass as a Component of Curvilinear Architecture in 21st Century, Procedia Engineering 161, Elsevier Science Direct (2016) : 1490-1495., 2016

3. Dimčić Miloš, Structural Optimization of Grid Shells based on Genetic Algorithms, Institut für Tragkonstruktionen und Konstruktives Entwerfen, Universität Stuttgart,, Stuttgart, 2011

4. Januszkiewicz K., Curvilinear structural envelops in current architecture, Architecture Civil Engineering Environment, 2017, Vol. 10, pp. 11-16.

5. Baliński G., Januszkiewicz K., Digial Tectonic Design as a new Approach to Architectural Design Methodology, Procedia Engineering 161, 2016, pp. 1504-1508.

Supplementary reading
6. Januszkiewicz K., Evolutionary digital tools in designing nonlinear shaping of concrete structures in current architecture, Central European Congress on Concrete Engineering, Concrete Structures in Urban Areas, Wrocław, 2013
7. Dh. Yeo, R. D. Gabbai, Sustainable design of reinforced concrete structures through embodied energy optimization, Energy and Buildings, Elsevier, 2011, Vol. 43, No. 8., pp. 2028-2033.
8. Moon K. S., Sustainable structural engineering strategies for tall buildings, John Wiley and Sons, London, 2016

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Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Sustainable Construction**		
Code	WBIA/S2CE/ES/D/06-2		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Fizyki Budowli i Materiałów Budowlanych		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives	7	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Kurtz-Orecka Karolina (Karolina.Kurtz@zut.edu.pl)
Other teachers	Stolarska Agata (Agata.Siwinska@zut.edu.pl), Strzałkowski Jarosław (Jaroslaw.Strzalkowski@zut.edu.pl), Wygocka-Domagałło Agata (Agata.Wygocka@zut.edu.pl)

Prerequisites

W-1	Building Materials, Civil Engineering

Module/course unit objectives

C-1	Knowledge of design challenges for a changing climate - Basic knowledge of modern low-energy buildings design standards
C-2	Skills of defining main energy demands of building according to its features - Skills of finding proper solutions for construction for different climates

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design for sustainability - design for climate change	15
T-W-1	Sustainable development	1
T-W-2	Climate change and challenges for the building environment	1
T-W-3	Building energy demands	2
T-W-4	Contemporary low-energy building standards	2
T-W-5	Sankey diagrams - Building thermal energy model	3
T-W-6	Design for sustainability - design for climate change	6

Student workload - forms of activity		*Number of hours*
A-P-1	Classes participation	15
A-P-2	Project work	12
A-P-3	Preparing for project presentation	3
A-W-1	Classes participation	15
A-W-2	Essays preparation	10
A-W-3	Preparation for passing	5

Teaching methods / tools

M-1	Lecture
M-2	Project work
M-3	Essays

Evaluation methods (F - progressive, P - final)

S-1	F	Continuous assesment
S-2	P	Grade
S-3	P	Project work

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/05-3_W01 Has advanced knowledge related to buildings sustainable design issues and developmental trends in moder low-energy buildings design	B-A_2A_W06 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1 M-2 M-3	S-1 S-2 S-3
Skills							
B-A_2A_ES/D/05-3_U01 Skills to define energy demands of building for different climates and choosing building construction solutions in case of climate change	B-A_2A_U01 B-A_2A_U11	P7S_UK		C-2	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1 M-2 M-3	S-1 S-2 S-3
Other social / personal competences							
B-A_2A_ES/D/05-3_K01 Is able professionally define, classify and apply the priorities used for accomplishment of an undertaken engineering task	B-A_2A_K01	P7S_KK		C-1 C-2	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1 M-2 M-3	S-1 S-2 S-3

Required reading

1. Edwards B., Rough Guide to Sustainability - 3rd Edition, RIBA Pablishing, London, 2010

2. Guzowski M., Towards Zero-energy Architecture - New Solar Design, Laurence King Publishing, London, 2010

3. Hegger M., Fuchs M., Stark T., Zeumer M., Energy Manual. Sustainable Architecture - Edition Detail, Birkhäuser, Basel, Boston, Berlin, 2008

4. Smith P.F., Architecture in a Climate of Change - A guide to sustainable design - Second edition., Elsevier Architectural Press, Amsterdam – Boston – Heidelberg – London – New York – Oxford – Paris – San Diego – San Francisco – Singapore – Sydney – Tokyo, 2005

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Field of study	Civil Engineering		
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Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Issues in Contemporary Building Physics**		
Code	WBIA/S2CE/ES/D/07		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Fizyki Budowli i Materiałów Budowlanych		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
laboratory course	L	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Wygocka-Domagałło Agata (Agata.Wygocka@zut.edu.pl)
Other teachers	Kurtz-Orecka Karolina (Karolina.Kurtz@zut.edu.pl), Stolarska Agata (Agata.Siwinska@zut.edu.pl), Strzałkowski Jarosław (Jaroslaw.Strzalkowski@zut.edu.pl)

Prerequisites

W-1	Building Materials, Civil Engineering

Module/course unit objectives

C-1	Understanding of thermal bridges impact on thermal and moisture behavior of building constructions - Skills to evaluation of hygrothermal state of construction details

Course content divided into various forms of instruction		*Number of hours*
T-L-1	Building air permeability test – fan pressurization method	2
T-L-2	Infrared thermography – exterior and interior measurements	2
T-L-3	Measurements of indoor climate parameters. Thermal comfort parameters - PMV/PPD method	8
T-L-4	Measurements of thermal conductivity and heat capacity of building materials	2
T-L-5	Test	1
T-W-1	Thermal bridges in construction - Computation of linear thermal bridge coefficient - Thermal and moisture control of thermal bridges	7
T-W-2	Air permeability of buildings - Testing methods - Regulation requierments	2
T-W-3	Infrared thermography in building diagnostics - Fundamentals of infrared thermal imaging - Thermal images interpretation - Measurements errors	4
T-W-4	Parameters of the indoor microclimate	1
T-W-5	Final Test	1

Student workload - forms of activity		*Number of hours*
A-L-1	Participation in laboratory classes	15
A-L-2	Analysis of results and reports preparation	5
A-L-3	Preparation for test	10
A-W-1	Classes participation	15
A-W-2	Preparation for final test	15

Teaching methods / tools

M-1	Lecture
M-2	Workshop
M-3	Laboratory

Evaluation methods (F - progressive, P - final)

S-1	P	Grade
S-2	F	Project work

Evaluation methods (F - progressive, P - final)		
S-3	F	Continuous assesment
S-4	F	Reports assesment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/06_W01 Knowledge in the filed of hygrothermal and air tightness behavior of modern buildings	B-A_2A_W02 B-A_2A_W06	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-3 T-W-2 T-W-4	M-1 M-2	S-1 S-3
Skills							
B-A_2A_ES/D/06_U01 Skills of proper selection and practical application of modern techniques for assessing physical phenomena in buildings	B-A_2A_U01	P7S_UK		C-1	T-L-1 T-W-1 T-L-2 T-W-2 T-L-3 T-W-3 T-L-4 T-W-4	M-1 M-2 M-3	S-1 S-2 S-3 S-4
Other social / personal competences							
B-A_2A_ES/D/06_K01 Responsibility for reliability of the obtained measurements and calculations results	B-A_2A_K02	P7S_KK		C-1	T-L-1 T-L-4 T-L-2 T-W-1 T-L-3	M-2 M-3	S-2 S-3 S-4

Required reading

1. Hegger M., Fuchs M., Stark T. Zeumer M., Energy Manual - Sustainable Architecture - Edition Detail, Birkhäuser, Basel, Boston, Berlin, 2008

2. Incopera F.P., DeWitt D.P., Bergman T.L., Lavine A.S., Fundamentals of Heat and Mass Transfer - Sixth Edition, John Wiley & Sons, Hoboken, 2007

3. McMullan R., Environmental Science in Building - Fifth edition, Palgrave MacMillan, New York, 2006

4. Hens H., Applied building physics. Boundary conditions, building performace and material properties., Ernst & Sohn, Berlin, 2011

5. Vollmer M., Möllmann K. P., Infrared Thermal Imaging: Fundamentals, Research and Applications, Wiley VCH Verlag GmbH & Co. KGaA, Weinheim, 2018, 2nd Edition

6. EN ISO, EN, ISO Standards

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Earthen Structures**		
Code	WBIA/S2CE/ES/D/10		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Geotechniki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl)
Other teachers	Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl), Żarkiewicz Krzysztof (Krzysztof.Zarkiewicz@zut.edu.pl)

Prerequisites

W-1	Basic of soil mechanics

Module/course unit objectives

C-1	Acquainting the student with complex problems of designing of the earth structures

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design exercises from earth structures: designing earth embankment dimensions founded on the weak soils, filtration calculations, slope stability calculations	15
T-W-1	Soil properties in constructions and earthworks. The impact of the compaction process on changes in soil parameters.	2
T-W-2	Execution of earth construction facilities on a substrate of weak and organic soils	2
T-W-3	Reconstruction and rebuilding of embankments and unstable slopes	2
T-W-4	Construction types of earth dams. Factors affecting the selection of the damm location. Drainage in earth dams - their function and construction in the body and ground of dams	2
T-W-5	Sealing barrier in to the body and base of the embankment - cores, screens (plastic and rigid), aprons, injection, clay veils in narrow-space trenches (performed under the cover of a thixotropic suspension)	3
T-W-6	Slope stability calculation methods	2
T-W-7	Control of compaction methods, and quality testing of soil embedded in the embankment (during the construction, and after that)	2

Student workload - forms of activity		*Number of hours*
A-P-1	Presence at the class	15
A-P-2	Design project of earhen structure founded on weak soil	15
A-W-1	Presence at class	15
A-W-2	Own work with literature	5
A-W-3	Powerpoint presentation has to be prepared by student	5
A-W-4	Preparation for final test exam	5

Teaching methods / tools

M-1	Lectures method
M-2	Project Desing method

Evaluation methods (F - progressive, P - final)

S-1	F	Countinous rating of student progress
S-2	P	Test exam rating

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_ES/D/07_W01 He has knowledge about design the foundation of the embankment in complex geotechnical conditions	B-A_2A_W02 B-A_2A_W03 B-A_2A_W04 B-A_2A_W08	P7S_WG_TA21	P7S_WG_IA21	C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ES/D/07_U01 He can design the foundation of the embankment in complex geotechnical conditions	B-A_2A_U11 B-A_2A_U21 B-A_2A_U22	P7S_UK P7S_UW_TA24		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7	M-2	S-1
Other social / personal competences							
B-A_2A_ES/D/07_K01 He can work with a group to achieve the desired engeneering effect.	B-A_2A_K02 B-A_2A_K08	P7S_KK P7S_KO		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7	M-1 M-2	S-1

Required reading

1. L. Vanicek, M Vanicek, Earth Structures: In Transport, Water and Environmental Engineering, Springer- Verlag, 2007, ISBN-13: 9781402039638

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Structural Reliability Theory**		
Code	WBIA/S2CE/ES/D/11		
Field of specialisation	Engineering Structures		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	30	1,0	0,50	credits

Leading teacher	Iwankiewicz Radosław (riwankiewicz@zut.edu.pl)
Other teachers	Silicka Ewa (Ewa.Silicka@zut.edu.pl)

Prerequisites	
W-1	Mathematics courses pertinent to BSc in Engineering degree course.
W-2	Structural Mechanics.

Module/course unit objectives	
C-1	Capability to use the methods of probability theory, in particular the methods of random variables in problems of structural reliability.
C-2	Capability to formulate and solve the reliability problem for linear failure (safety margin, or limit state) function and normal basic variables.
C-3	Capability to formulate and solve the reliability problem for non-linear failure (safety margin, or limit state) function and normal basic variables.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Example problems: determination of probability of failure and survival (reliability) of single structural elements and their combinations (in series, in parallel, etc.)	3
T-P-2	Example problems: determination of probability distribution function, cumulative distribution function and statistical moments of some discrete random variables.	4
T-P-3	Example problems: determination of probability density, cumulative distribution function and statistical moments of some continuous random variables.	4
T-P-4	Example problems: determination of approximate reliability index for non-linear safety margin functions with the aid of Cornell method.	2
T-P-5	Example problems: iterative determination of reliability index for non-linear safety margin functions with the aid of Hasofer-Lind method.	2
T-W-1	Uncertainties in Structural Engineering. Events of failure and survival.	2
T-W-2	Probability theory (revision). Sample space and events. Axioms and theorems of probability theory. Probability of failure and survival (reliability) of single structural elements and their combinations.	4
T-W-3	Random variables: discrete and continuous probability distribution, cumulative distribution and density function, statistical moments. Transformation of random variables. Example probability distributions, e.g. Gaussian (normal), lognormal, extreme value distributions type I (Gumbel), type II (Frechet), type III (Weibull).	8
T-W-4	Safety margin and reliability index for linear failure (safety margin, or limit state) function and normal basic variables.	4
T-W-5	Non-linear safety margin (failure or limit state) function and normal basic variables. Linearization (Taylor series expansion) about the mean point (about the expected values) - Cornell method. Approximate reliability index .	4
T-W-6	Non-linear safety margin (failure or limit state) function and normal basic variables. Linearization (Taylor series expansion) about the design point – Hasofer-Lind method.	4
T-W-7	Poisson counting process and reliability vs. time: probability distribution of time to failure, expected life-time, expected failure (breakdown rate), expected time between breakdowns .	4

Student workload - forms of activity		*Number of hours*
A-P-1	Attending the example classes.	15
A-P-2	Private (home) study.	5

Student workload - forms of activity		*Number of hours*
A-P-3	Home assignments (two major assignments).	5
A-P-4	Studying/revision for the final test.	5
A-W-1	Attending the lectures.	30

Teaching methods / tools	
M-1	Lectures.
M-2	Solving problems and home assignments.

Evaluation methods (F - progressive, P - final)		
S-1	F	Final test mark.
S-2	F	Assessment of home assignments.

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/08_W01 Student should be able to develop simple mathematical models for analysis of structural reliability.	B-A_2A_W01	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-P-4 T-W-5 T-P-5 T-W-6 T-W-1 T-W-7	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ES/D/08_U01 Student should be able to solve numerically the equations occurring in structural reliability problems.	B-A_2A_U01	P7S_UK		C-1 C-2 C-3	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-P-4 T-W-5 T-P-5 T-W-6 T-W-1 T-W-7	M-1 M-2	S-1 S-2
Other social / personal competences							
B-A_2A_ES/D/08_K01 Student shows the capability to make a plan for an undertaken research/computational project, to execute it and to observe deadlines.	B-A_2A_K01	P7S_KK		C-1 C-2 C-3	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-P-4 T-W-5 T-P-5 T-W-6 T-W-1 T-W-7	M-1 M-2	S-1 S-2

Required reading

1. Robert E. Melchers, Structural Reliability Analysis and Prediction, John Wiley and Sons, 1999

2. P. Thoft-Christensen and Y. Murotsu, Application of Structural Systems Reliability Theory, Springer, Berlin, 1986

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Complex Concrete Structures II**		
Code	WBIA/S2CE/ES/D/12		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Konstrukcji Żelbetowych i Technologii Betonu		
ECTS	4,0	*ECTS (forms)*	4,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	30	2,0	0,50	credits
lecture	W	2	30	2,0	0,50	examination

Leading teacher	Kiernożycki Włodzimierz (Wlodzimierz.Kiernozycki@zut.edu.pl)
Other teachers	Brzozowski Piotr (Piotr.Brzozowski@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Zielinski Adam (Adam.Zielinski@zut.edu.pl)

Prerequisites

W-1	Passed Complex Concrete Structures course

Module/course unit objectives

C-1	Ability to design complex engineering structures
C-2	Identification of static diagrams, complex load diagrams, application of unusual methods of structure analysis

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Individual design of a selected type of structure: tank, shell structure, load specification, static calculations, dimensioning of elements, structural drawings	30
T-W-1	General considerations: safety and durability of structures	2
T-W-2	Spatial structures – static diagrams and designing rules: arches, shell structures, plates, tanks, bunkers, silo	24
T-W-3	Structural integrity and failure of reinforced concrete structures: cracking, deflection, corrosion, safety and reinforcement of structures	4

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	30
A-P-2	Individual preparation of design assignment	20
A-P-3	Participation in consultations	4
A-P-4	Preparation for grading	5
A-P-5	Controlled Assessment	1
A-W-1	Participation in classes	30
A-W-2	Lecture preparation – literature study	23
A-W-3	Preparation for the exam	4
A-W-4	Taking an exam	3

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Written exam
S-2	P	Coursework assessment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods

Knowledge							
B-A_2A_ES/D/09_W01 Knows and understands: identification of static diagrams and loads in complex concrete structures, rules for designing spatial structures, durability and structural safety issues	B-A_2A_W05 B-A_2A_W06 B-A_2A_W08 B-A_2A_W10	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1 T-W-3 T-W-2	M-1	S-1 S-2
Skills							
B-A_2A_ES/D/09_U01 Can design complex concrete structures and prepares design drawings	B-A_2A_U08 B-A_2A_U15 B-A_2A_U17 B-A_2A_U21	P7S_UW_TA24	P7S_UW_IA24	C-1 C-2	T-P-1 T-W-2 T-W-1 T-W-3	M-2	S-2
Other social / personal competences							
B-A_2A_ES/D/09_K01 Student presents unclear data, unfinished solutions, follows the work ethics	B-A_2A_K01 B-A_2A_K05 B-A_2A_K06	P7S_KK P7S_KO P7S_KR		C-1 C-2	T-P-1 T-W-2 T-W-1 T-W-3	M-1 M-2	S-1 S-2

Required reading

1. Giandomenico Toniolo, Marco di Prisco, Michele Win Tai Mak, Reinforced Concrete Design to Eurocode 2, Springer Verlag GmbH, 2017
2. W. H. Mosley, Reinforced Concrete Design, PALGRAVE MACMILLAN, 2012
3. Millais, Malcolm, Building structures : from concepts to design, Spon Press, New York, 2005
4. MacGregor, James Grierson, Reinforced concrete : mechanics and design, Pearson Prentice Hall, 2006
5. A. M. Neville, Properties of concrete, London, 2011
6. Starosolski W., Konstrukcje żelbetowe, według EC2 t. I-V, PWN, Warszawa, 2011
7. EN 1992-1-1, Eurocode2 :Design of concrete structures - Part 1-1:General rules and rules for buildings, 2010
8. EN 1992-3, Eurocode 2 - Design of conrete structures - Part 3: Liquid retainig and contaiment structures, 2006

Supplementary reading

1. EN 1990, Eurocode - Basic of structural design, 2002

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Complex Metal Structures II**		
Code	WBIA/S2CE/ES/D/13		
Field of specialisation	Engineering Structures		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	4,0	*ECTS (forms)*	4,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	30	2,0	0,50	credits
lecture	W	2	30	2,0	0,50	examination

Leading teacher	Pełka-Sawenko Agnieszka (Agnieszka.Pelka-Sawenko@zut.edu.pl)
Other teachers	Abramowicz Małgorzata (Malgorzata.Abramowicz@zut.edu.pl), Paczkowski Wiesław (Wieslaw.Paczkowski@zut.edu.pl)

Prerequisites

W-1	Passed Complex Metal Structures

Module/course unit objectives

C-1	Ability to design complex metal structures objects
C-2	Developing skills of independent solving of problems related to steel construction

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of a steel flyover with EOT crane. Evaluating of the limit states and drawings preparation (assembly, workshop section, selected construction and assembly details)	30
T-W-1	Principles design of complex metal structures: - steel halls (Calculation of spatial systems, building and assembly of the structure) - flyover and EOT crane - plastic analysis of the structure - large-span structures - high buildings	30

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	30
A-P-2	Individual preparation of design assignment	27
A-P-3	Controlled assessment	3
A-W-1	Participation in lectures	30
A-W-2	Preparing for the exam (own work)	27
A-W-3	Participation in the exam	3

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Passing the exam
S-2	P	Passing the controlled assignment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

B-A_2A_ES/D/10_W01 The student is able to distinguish, define and identify certain complex objects of metal construction (halls, flyovers, large span covers), propose their construction and technological solutions ensuring an appropriate level of security and technological	B-A_2A_W05 B-A_2A_W08 B-A_2A_W10	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1	M-1	S-1 S-2
Skills							
CE_2A_ES/D/10_U01 The student is able to project basics elements complex objects of metal construction	B-A_2A_U17 B-A_2A_U25	P7S_UK P7S_UW_TA22 P7S_UW_TA23 P7S_UW_TA24		C-2	T-P-1	M-2	S-2
Other social / personal competences							
CE_2A_ES/D/10_K01 The student is able in both professional and social way to project and understand basics elements of complex objects of metal construction	B-A_2A_K02 B-A_2A_K03	P7S_KK		C-1 C-2	T-P-1 T-W-1	M-1 M-2	S-2

Required reading

1. Biegus A., Steel hall buildings, Arkady, warszawa, 2003

2. Kucharczuk W. Labocha S., Steel halls. Designer's guide, Polskie Wydawnictwo Techniczne, 2012

3. Łubiński M., Metal structures, cz II, Arkady, Warszawa, 2004

4. Matysiak A., Steel Construction: EOT Crane beams, flyovers, PWN, Warszawa-Poznań, 1994

5. Giżejowski M., General construction, t5, Steel structures of buildings, design by Eurocodes with examples, Arkady, Warszawa, 2010

Supplementary reading

1. Pałkowski Sz., Steel structures. Selected problems of calculation and design, PWN, Warszawa, 2010

2. Kapela M., Sieczkowski J., Designing the construction of multi-storey buildings, Oficyna Wydawnicza Politechniki Warszawskej, Warszawa, 2003

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Computer Aided Metal Structures Design**		
Code	WBIA/S2CE/ES/D/14		
Field of specialisation	Engineering Structures		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
laboratory course	L	2	30	1,3	0,50	credits
lecture	W	2	15	0,7	0,50	credits

Leading teacher	Popiel Piotr (Piotr.Popiel@zut.edu.pl)
Other teachers	Abramowicz Małgorzata (Malgorzata.Abramowicz@zut.edu.pl), Pełka-Sawenko Agnieszka (Agnieszka.Pelka-Sawenko@zut.edu.pl)

Prerequisites

W-1	Computer skills. Knowledge of the main mechanical and technological properties of steel and the basic range of steel products; ability to design and construct simple steel elements (beams, columns, bearings); knowledge of the basic design principles of steel halls.

Module/course unit objectives

C-1	The student can create drawing documentation of a building with steel structure

Course content divided into various forms of instruction		*Number of hours*
T-L-1	The design of the building structure made of hot-rolled elements.	30
T-W-1	The use of CAD programs to prepare drawing documentation of complex metal structures. Introduction to the Bocad program (Tekla): structural modeling, drawing generation, macrodefinitions, COPL prametric macros, interactive tables.	15

Student workload - forms of activity		*Number of hours*
A-L-1	Participation in classes	30
A-L-2	Individual preparation of design assignment	9
A-W-1	Participation in lectures	15
A-W-2	Individual study	6

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Passing the controlled assignment
S-2	P	Passing the lecture test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_ES/D/11_W01 The student knows advanced methods of making drawings of steel structures	B-A_2A_W09	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1	M-1	S-2
Skills							
CE_2A_ES/D/11_U01 The student is able to create drawing documentation of a steel structure with the use of advanced CAD programs	B-A_2A_U07 B-A_2A_U08	P7S_UW_TA22 P7S_UW_TA24	P7S_UW_IA22 P7S_UW_IA24	C-1	T-L-1	M-2	S-1
Other social / personal competences							

CE_2A_ES/D/11_K01 Student has awareness of the need for individual studying and upgrading professional skills	B-A_2A_K01	P7S_KK		C-1	T-L-1 T-W-1	M-1 M-2	S-1 S-2

Required reading

1. BOCAD Service International, COPL - Bocad - 3D, własne, Bohun, 2011

Supplementary reading

1. Bocad, Bocad 3D manual, Bocad, Ostrów Wlkp., 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Theory of Constructions II**		
Code	WBIA/S2CE/ES/D/15		
Field of specialisation	Engineering Structures		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
laboratory course	L	2	30	1,5	0,50	credits
lecture	W	2	15	1,5	0,50	examination

Leading teacher	Silicki Adrian (Adrian.Silicki@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Mathematics
W-2	Strength of materials

Module/course unit objectives	
C-1	Create an ability to calculate internal forces and stresses in thin-walled structures
C-2	Create an ability to solve stability problems of thin-walled structures

Course content divided into various forms of instruction		*Number of hours*
T-L-1	Calculation of geometrical characteristics of cross-sections of thin-walled bars	10
T-L-2	Calculation of internal forces and stress in thin-walled structures	10
T-L-3	Calculation of critical force of thin-walled bars	10
T-W-1	Cross-section geometrical characteristics of thin-walled bars	5
T-W-2	Internal forces and stress in thin-walled structures	5
T-W-3	Stability of thin-walled structures	5

Student workload - forms of activity		*Number of hours*
A-L-1	Attendance at classes	30
A-L-2	Preparing for classes	10
A-L-3	Revision of material	5
A-W-1	Presence on lectures	15
A-W-2	Individual study	19
A-W-3	Revision of material	8
A-W-4	Exam	3

Teaching methods / tools	
M-1	Lecture
M-2	Classes at computer laboratory

Evaluation methods (F - progressive, P - final)		
S-1	F	Continuous assessment of student's work and activity
S-2	F	Evaluation of laboratory exercises
S-3	P	Test
S-4	P	Exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/12_W01 Has detailed knowledge within the scope of theory of thin-walled bars	B-A_2A_W05 B-A_2A_W06	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1 T-W-3 T-W-2	M-1	S-4
Skills							
B-A_2A_ES/D/12_U01 Is able to formulate and solve problems of static and stability analysis of thin-walled structures	B-A_2A_U10 B-A_2A_U19	P7S_UW_TA21 P7S_UW_TA24	P7S_UW_IA21	C-1 C-2	T-L-1 T-L-3 T-L-2	M-2	S-1 S-2 S-3
Other social / personal competences							
B-A_2A_ES/D/12_K01 Is aware of responsibility for reliability of the obtained results of his/her calculations	B-A_2A_K02	P7S_KK		C-1 C-2	T-L-1 T-L-3 T-L-2	M-2	S-1 S-2

Required reading

1. Jack R. Vinson, The Behavior of Thin Walled Structures: Beams, Plates and Shells, Springer, 1989

2. Dan Dubina (et al., eds.), Design of Cold-Formed Steel Structures, Wiley - Blackwell, 2012

3. Wei-Wen Yu, Cold-Formed Steel Design, John Wiley and Sons, New York, 2000

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Diagnostics and Modernization of Buildings**		
Code	WBIA/S2CE/ES/D/16		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Budownictwa Ogólnego		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	3	15	1,0	0,50	credits
lecture	W	3	15	1,0	0,50	credits

Leading teacher	Orłowicz Romuald (Romuald.Orlowicz@zut.edu.pl)
Other teachers	Jaworski Rafał (Rafal.Jaworski@zut.edu.pl), Nowak Rafał (Rafal_Nowak@zut.edu.pl), Skibicki Szymon (Szymon.Skibicki@zut.edu.pl), Tkacz Piotr (Piotr.Tkacz@zut.edu.pl)

Prerequisites

W-1	Strength of materials (basic)

Module/course unit objectives

C-1	Basic knowledge of building repair methods
C-2	Basic knowledge of rules of investigation of cracked buildings.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Modernisation of building design	15
T-W-1	Design procedures of modernisation of buildings. Investigation, repairs and strengthening. Crack patterns for builldings and their cause.	15

Student workload - forms of activity		*Number of hours*
A-P-1	Design workshop	15
A-P-2	Individual student work	15
A-W-1	Participation in classes	15
A-W-2	Individual student work	15

Teaching methods / tools

M-1	Lectures
M-2	Design workshop

Evaluation methods (F - progressive, P - final)

S-1	P	Written exam
S-2	P	Project works

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/13_W01 Student has extended knowledge over diagnostic and modernisation of buildings.	B-A_2A_W06 B-A_2A_W12	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1	M-1 M-2	S-1
Skills							
B-A_2A_ES/D/13_U01 Student can design needed repairs for buildings. Student can plan diagnostic procedures for buildings.	B-A_2A_U09 B-A_2A_U25	P7S_UK P7S_UW_TA21 P7S_UW_TA22 P7S_UW_TA23	P7S_UW_IA21	C-1 C-2	T-P-1	M-2	S-2
Other social / personal competences							

B-A_2A_ES/D/13_K01 Student can design needed repairs for buildings. Student can plan diagnostic procedures for buildings. Student fells responsible for his repair choices.	B-A_2A_K01 B-A_2A_K02 B-A_2A_K06	P7S_KK P7S_KR		C-2	T-W-1	M-1 M-2	S-1 S-2

Required reading

1. EN 1990: Eurocode - Basis of structural design, 2011

2. EN 1996-1: Eurocode 6: Design of masonry structures, 2011

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Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Theory of Elasticity and Plasticity**		
Code	WBIA/S2CE/ES/D/17		
Field of specialisation	Engineering Structures		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	3	15	1,0	0,50	credits
lecture	W	3	30	1,0	0,50	credits

Leading teacher	Silicka Ewa (Ewa.Silicka@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Differential and integral calculus
W-2	Analysis of stress and strains states in bar structures.
W-3	Acqaintance with general laws iof theory of plasticity.

Module/course unit objectives

C-1	Acquaintance with general laws in theory of elasticity.
C-2	Ability to solution of plane state of strss and plane state of strains.
C-3	Acquaintance with strss and strains analysis for 3D structures.
C-4	Acqaintance with classic theory of plates.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Revision of calculus of differences and intergrals.	1
T-P-2	Problem of plane state of stress and plane state of strains in cartesian coordinate system. Levy'e differential equation and Airy's function solution.	5
T-P-3	Problem of plane state of stress and plane state of strains in polar coordinate system. Axisymmetrical state of stress and strains solution.	3
T-P-4	Problem of classis plate theory. Determination of internal forces and stress in plates. Plate differential equation solution.	4
T-P-5	Test	2
T-W-1	Analysis of state of stress and strains in 3D - general information. General Hooke's law and Cauchy's equations.	4
T-W-2	Analysis of plane state of stress and plane state of strains in cartesian coordinate system. Levy'e differential equation and Airy's function.	6
T-W-3	Analysis of plane state of stress and plane state of strains in polar coordinate system. Axisymmetrical state of stress and strains.	5
T-W-4	Analysis of state of stress and strains in 3D structures. Invariants of stress state.	6
T-W-5	Classis plate theory. Internal forces and stress in plates. Plate differential equation.	5
T-W-6	Theory of plasticity - general information.	4

Student workload - forms of activity		*Number of hours*
A-P-1	Attending the classes	15
A-P-2	Home assignments	9
A-P-3	Revision to test.	6
A-W-1	Presence on lectures	30

Teaching methods / tools

Teaching methods / tools	
M-1	Lecture
M-2	Example classes
M-3	Home assignments

Evaluation methods (F - progressive, P - final)		
S-1	F	Mark of the final test

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ES/D/14_W01 Knows and understands general laws of stress and strains states in accordance to engineering structures.	B-A_2A_W03	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3 C-4	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1	S-1
Skills							
B-A_2A_ES/D/14_U01 Is able to analyze stress and strains states in simple engineering structures.	B-A_2A_U17	P7S_UW_TA24		C-1 C-2 C-3 C-4	T-P-1 T-P-4 T-P-2 T-P-5 T-P-3	M-2 M-3	S-1
Other social / personal competences							
B-A_2A_ES/D/14_K01 Understands responsibility for the profesionally made calculations.	B-A_2A_K02	P7S_KK		C-1 C-2 C-3 C-4	T-P-2 T-P-4 T-P-3	M-2 M-3	S-1

Required reading
1. Timoshenko s., Goodier J. N., Theory of Elasticity, McGraw-Hill, New York

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Timber Structures**		
Code	WBIA/S2CE/ES/D/18		
Field of specialisation	Engineering Structures		
Administering faculty	Katedra Budownictwa Ogólnego		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	3	15	1,0	0,60	credits
lecture	W	3	30	1,0	0,40	credits

Leading teacher	Nowak Rafał (Rafal_Nowak@zut.edu.pl)
Other teachers	Jaworski Rafał (Rafal.Jaworski@zut.edu.pl), Nowak Rafał (Rafal_Nowak@zut.edu.pl), Skibicki Szymon (Szymon.Skibicki@zut.edu.pl), Tkacz Piotr (Piotr.Tkacz@zut.edu.pl)

Prerequisites

W-1	Strength of materials (basic)

Module/course unit objectives

C-1	Basic knowledge of timber structural engineering
C-2	Basic knowledge of European Standards for timber structures

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design and detailing of glued lamined timber building.	15
T-W-1	Introduction to glued laminated timber structure. The structure of glued laminated timber. Characteristics of glued laminated timber. Mechanical and technological properties.	6
T-W-2	Types of glued laminated timber structure.	2
T-W-3	Eurocodes (general structure, Basis of structural design and design of glued laminated timber structures).	6
T-W-4	Design of basic glued lamited timber elements.	4
T-W-5	Design of cross-sections subjected to combined stresses. Stability of members.	4
T-W-6	Serviceability limit states in glued laminated timber structures.	4
T-W-7	Design of Connections for glued lamined timber structures.	4

Student workload - forms of activity		*Number of hours*
A-P-1	Design workshop	15
A-P-2	Individual student work	15
A-W-1	Participation in classes	30

Teaching methods / tools

M-1	Lectures
M-2	Design workshop

Evaluation methods (F - progressive, P - final)

S-1	P	Written test
S-2	P	Project works

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

B-A_2A_ES/D/15_W01 Student knows European Standards for timber structures	B-A_2A_W08 B-A_2A_W10 B-A_2A_W11 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-5 T-W-1 T-W-6 T-W-2 T-W-7 T-W-3	M-1	S-1
Skills							
B-A_2A_ES/D/15_U01 Student can set up the loading acting on structure according to European Standards. Student can design of glued lamined timber structure.	B-A_2A_U01 B-A_2A_U21 B-A_2A_U25	P7S_UK P7S_UW_TA22 P7S_UW_TA23 P7S_UW_TA24		C-1 C-2	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7	M-2	S-2
Other social / personal competences							
B-A_2A_ES/D/15_K01 Student understand rule of design of glued lamined timber structures.	B-A_2A_K04 B-A_2A_K06	P7S_KK P7S_KR		C-1 C-2	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7	M-1 M-2	S-1 S-2

Required reading

1. Ozelton, E.C., Baird, J. A., Timber Designers’ Manual, Blackwell Publishing, 2006

2. Porteous, J., Kermani, A., Structural Timber Design to Eurocode 5, Blackwell Publishing, 2007

3. EN 1990: Eurocode - Basis of structural design, 2011

4. Eurocode 1: Actions of structures, parts: EN 1991-1-1; EN 1991-1-3; EN 1991-1-4, 2011

5. EN 19951-1: Eurocode 5: Design of timber structures, 2011

Supplementary reading

1. Hugues, T., Steiger L., Weber, J., Timber Construction. Details. Products. Case studies., 2011

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Theory of Constructions**		
Code	WBIA/S2CE/ICM/D/01		
Field of specialisation	International Construction Management		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
laboratory course	L	1	15	1,0	0,34	credits
project course	P	1	15	1,0	0,33	credits
lecture	W	1	15	1,0	0,33	credits

Leading teacher	Weber Hanna (Hanna.Weber@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	Mathematics
W-2	Physics
W-3	Structural Mechanics
W-4	Numerical Methods

Module/course unit objectives	
C-1	Knowledge in the field of Statics and limit states of continuous bars.
C-2	Ability to construct influence lines and moment envelope in continuous beams.
C-3	Ability to consider the beams on flexible ground.
C-4	Ability to consider Statics of cables and chains.
C-5	Ability to solve the problems of limit states of bar systems.

Course content divided into various forms of instruction		*Number of hours*
T-L-1	Plane state of stress	3
T-L-2	Torsion of thin-walled cross-section	3
T-L-3	Observation and visualization of vibrations	3
T-L-4	Elastic buckling of bar	2
T-L-5	Influence lines of continuous beam.	2
T-L-6	Stretching of non-symmetrical thin-walled cross-section	2
T-P-1	Influence lines of continuous beams.	5
T-P-2	Beams on flexible ground.	5
T-P-3	Limit states of beams and frames	5
T-W-1	Static indeterminate continuous beams, influence lines.	3
T-W-2	Cables and chains	2
T-W-3	Beams on flexible ground	4
T-W-4	Limit states of beams and frames	6

Student workload - forms of activity		*Number of hours*
A-L-1	Attending the laboratory classes.	15
A-L-2	Preparation for laboratory classes	15
A-P-1	Attending the project classes	15
A-P-2	Preparation for project classes	5

Student workload - forms of activity		*Number of hours*
A-P-3	Execution of project assignment	10
A-W-1	Attending the lectures.	15
A-W-2	Studying/revision for the final exam.	13
A-W-3	Participation in the exam.	2

Teaching methods / tools	
M-1	Lecture
M-2	Project class
M-3	Laboratory class

Evaluation methods (F - progressive, P - final)		
S-1	P	Written exam
S-2	F	Assesment of project assignment
S-3	F	Assesment during the laboratory classes

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_CE/C/01_W01 Student knows how to create numerical models for static indeterminate bar systems with permanent and live loads.	B-A_2A_W05	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-3 T-W-2 T-W-4	M-1	S-1
Skills							
CE_2A_CE/C/01_U01 Student is able to create numerical and measuring models in accordance with the addressed problem	B-A_2A_U19	P7S_UW_TA24		C-2 C-3 C-4 C-5	T-L-1 T-P-2 T-L-2 T-P-3 T-L-3 T-W-1 T-L-4 T-W-2 T-L-5 T-W-3 T-L-6 T-W-4 T-P-1	M-1 M-2 M-3	S-1 S-2 S-3
Other social / personal competences							
CE_2A_CE/C/01_K01 Student is aware of responsibility for his computation	B-A_2A_K02	P7S_KK		C-2 C-3 C-4 C-5	T-P-1 T-W-2 T-P-2 T-W-3 T-P-3 T-W-4 T-W-1	M-1 M-2	S-1 S-2

Required reading
1. Kenneth M. Leet, Chia-Ming Uang, Anne M. Gilbert, Fundamentals of Structural Analysis, McGraw-Hill, 2011, Fourth edition
2. Jacques Heyman, Elements of the theory of Structures, Cambridge University Press, 1996

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Computer Aided Design-1**		
Code	WBIA/S2CE/A/D/08-1		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Dróg i Mostów		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	30	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Czarnecki Jacek (Jacek.Czarnecki@zut.edu.pl)
Other teachers	Kacprzak Dominik (Dominik.Kacprzak@zut.edu.pl)

Prerequisites

W-1	Computer skills

Module/course unit objectives

C-1	Understanding the principles of CAD design in civil engineering

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Introductioin to project work, project subject	2
T-P-2	Inserting and calibrating the map, discussing the map symbols	2
T-P-3	Project of the road section with the use of CAD software (layout plan, longitudinal profile, cross sections)	26
T-W-1	Introduction to CAD systems, history of CAD software in civil engineering	2
T-W-2	Types of CAD software	1
T-W-3	Basic definitions and parameters regarding to road design with the use of CAD software	2
T-W-4	Types of maps in road design	1
T-W-5	Terrain model	1
T-W-6	Layout plan	2
T-W-7	Longitudinal profile	2
T-W-8	Cross sections	2
T-W-9	Traffic signing and road marking	2

Student workload - forms of activity		*Number of hours*
A-P-1	Workshops	30
A-W-1	Lectures	15
A-W-2	Individual learning	10
A-W-3	Preparing for the grade	4
A-W-4	Grade	1

Teaching methods / tools

M-1	Lecture
M-2	Workshop

Evaluation methods (F - progressive, P - final)

S-1	P	Grade
S-2	P	Project work

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_A/C/08-1_W01 Student knows the basic principles of road design in CAD software. Knows the basic principles of creating and printing road drawings using the CAD software.	B-A_2A_W09	P7S_WG_TA21	P7S_WG_IA21	C-1	T-P-1 T-W-5 T-P-2 T-W-6 T-P-3 T-W-7 T-W-1 T-W-8 T-W-2 T-W-9 T-W-3	M-1 M-2	S-1 S-2
Skills							
B-A_2A_A/C/08-1_U01 Student can design a road section in CAD software. Can read surveying maps and construction drawings.	B-A_2A_U08	P7S_UW_TA24	P7S_UW_IA24	C-1	T-P-2 T-W-6 T-P-3 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9	M-1 M-2	S-2
Other social / personal competences							
B-A_2A_A/C/08-1_K01 Student understands the responsibility for the consequences of engineering activity and its impact on the environment.	B-A_2A_K03	P7S_KK		C-1	T-P-2 T-W-6 T-P-3 T-W-7 T-W-3 T-W-8 T-W-5 T-W-9	M-1 M-2	S-1 S-2

Required reading

1. Brian C. Benton, George Omura, Mastering AutoCAD 2018 and AutoCAD LT 2018, Sybex, 2017

Supplementary reading

1. https://www.mycadsite.com, 2018

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Cost Management in Construction -2**		
Code	WBIA/S2CE/ICM/D/09-2		
Field of specialisation	International Construction Management		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Bochenek Magdalena (Magdalena.Bochenek@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Basic knowledge of construction technology and construction materials

Module/course unit objectives

C-1	Upon completion of this course the student will be able to manage the construction cost effectively and accountably

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Cost management using software	15
T-W-1	Introduction to international cost management	1
T-W-2	International best practices	2
T-W-3	Simulation techniques for cost management	3
T-W-4	Managing risks within the project cost	3
T-W-5	Value management	3
T-W-6	Cost control and monitoring procedures	3

Student workload - forms of activity		*Number of hours*
A-P-1	Class Participation	15
A-P-2	Exercise preparation	15
A-W-1	Class Participation	15
A-W-2	Independent analysis of lecture content and literature recognition	7
A-W-3	Preparation for the exam	7
A-W-4	Final exam	1

Teaching methods / tools

M-1	Lecture, case studies

Evaluation methods (F - progressive, P - final)

S-1	F	continuous assessment
S-2	P	written exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_CE/D/18_W01 Student has the knowledge of managing the construction cost effectively and accountably.	B-A_2A_W14	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1	S-1 S-2

Skills							
CE_2A_CE/D/18_U01 Student is able to: analyse and control the cost for various cases.	B-A_2A_U24	P7S_UW_TA22		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-1 S-2
Other social / personal competences							
CE_2A_CE/D/18_K01 Student is able in both professional and responsible way use gained knowledge and skills in executions works associated with cost management.	B-A_2A_K05	P7S_KO		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-1 S-2

Required reading

1. K. Potts, N.Ankrah, Construction cost management, Routledge, 2017

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Social Aspects in International Construction Industry**		
Code	WBIA/S2CE/ICM/D/02		
Field of specialisation	International Construction Management		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecturing course	A	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Araszkiewicz Krystyna (Krystyna.Araszkiewicz@zut.edu.pl)
Other teachers	

Prerequisites	
W-1	knowledge of the basics of project management

Module/course unit objectives	
C-1	To understand the principles of international business development applied to construction.
C-2	To become familiar with the international contract documents.
C-3	To learn the forms of international design and construction management.
C-4	To understand social aspects of global construction market

Course content divided into various forms of instruction		*Number of hours*
T-A-1	The Case Study on a research topic in international project management and its effect in a practical environment using a specified case study. The international project and its characteristics: preparation, assumptions, assessment of effectiveness, implementation, control.	6
T-A-2	Building a project team - the role of organizational culture - teamwork.	4
T-A-3	Tools supporting design processes. Soft techniques in managing international projects.	4
T-A-4	completion of auditorium exercises	1
T-W-1	Introduction: the course syllabus and expectations. Introduction to International Construction (overview).	1
T-W-2	Current International Construction Market. Trends in International Construction.	1
T-W-3	International Project Organization.	2
T-W-4	Case study 1	1
T-W-5	Selecting an Associate and Getting Along in Other Cultures.	1
T-W-6	International Contracts. International Payment, Insurance, and Scope of Work. International Construction Arbitration (the FIDIC Contract and ICC Rules).	3
T-W-7	Supervisory Problems in International Construction.	1
T-W-8	Managing Employee Conflict in variuos cultural context. Case study 2.	1
T-W-9	Multi-Project Management and Control	1
T-W-10	Globalization and sustaiable construction industry	2
T-W-11	completion of lectures	1

Student workload - forms of activity		*Number of hours*
A-A-1	presence on the excercises	15
A-A-2	case study analysis	5
A-A-3	consultances	4
A-A-4	self-study as a homework (case studies)	5

Student workload - forms of activity		*Number of hours*
A-A-5	completion of auditorium excercises	1
A-W-1	presence on lectures	14
A-W-2	self - study, preparation for lectures completion	14
A-W-3	analysis of case studies	1
A-W-4	completion of lectures	1

Teaching methods / tools	
M-1	Lecture, case studies
M-2	Project based learning method

Evaluation methods (F - progressive, P - final)		
S-1	F	test
S-2	F	teamwork appraisal

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/01_W01 The students will understand theoretical foundations of International project management	B-A_2A_W07 B-A_2A_W14	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2 C-3 C-4	T-W-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-5 T-W-10 T-W-6	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ICM/D/01_U01 The student is able to characterize the basic soft competences important from the point of view of planning, implementation and monitoring of international projects	B-A_2A_U01 B-A_2A_U26	P7S_UK P7S_UU		C-1 C-2 C-3 C-4	T-A-1 T-W-1 T-A-2 T-W-2 T-A-3 T-W-8	M-1 M-2	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/01_K01 The student recognizes the relationship between the theoretical assumptions of international management and practical interactions in the institutional structure of specific international organizations	B-A_2A_K03	P7S_KK		C-1 C-2 C-3 C-4	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1 M-2	S-1 S-2

Required reading

1. Köster Kathrin, International Project Management, SAGE Publications Ltd, London, 2010

2. Lientz, B., & Rea, K., International project management., Routledge., 2012

Supplementary reading

1. Keeling, R., Project management: An international perspective., Macmillan, 2000

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**International Tender Management**		
Code	WBIA/S2CE/ICM/D/03		
Field of specialisation	International Construction Management		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecturing course	A	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Bochenek Magdalena (Magdalena.Bochenek@zut.edu.pl)
Other teachers	Bochenek Magdalena (Magdalena.Bochenek@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Basic knowledge of construction technology and construction materials

Module/course unit objectives

C-1	Upon completion of this course the student will be able to manage the international tender process effectively and accountably.

Course content divided into various forms of instruction		*Number of hours*
T-A-1	Case studies: international tendering	15
T-W-1	Introduction to international tendering	1
T-W-2	Developing a modern tender process	1
T-W-3	Pre-Qualification of bids	2
T-W-4	E-portals in tender process	1
T-W-5	International best practices	3
T-W-6	Tender evaluation proces and offer selection	3
T-W-7	Managing risks within the bid and tender processes	2
T-W-8	International Contract Conditions	2

Student workload - forms of activity		*Number of hours*
A-A-1	Class Participation	15
A-A-2	Exercise preparation	15
A-W-1	Class Participation	15
A-W-2	Independent analysis of lecture content and literature recognition	7
A-W-3	Preparation for the exam	7
A-W-4	Final exam	1

Teaching methods / tools

M-1	Lecture, case studies

Evaluation methods (F - progressive, P - final)

S-1	F	continuous assessment
S-2	P	written exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods

Knowledge							
CE_2A_ICM/D/02_W01 Student has the knowledge of managing the international tender process effectively and accountably.	B-A_2A_W14	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-5 T-W-2 T-W-6 T-W-3 T-W-7 T-W-4 T-W-8	M-1	S-2
Skills							
CE_2A_ICM/D/02_U01 Student is able to: analyze modern tender process for various case	B-A_2A_U24	P7S_UW_TA22		C-1	T-A-1 T-W-5 T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4	M-1	S-1 S-2
Other social / personal competences							
CE_2A_ICM/D/02_K01 Student is able in both professional and responsible way use gained knowledge and skills in executions works associated with international tendering	B-A_2A_K02	P7S_KK		C-1	T-A-1 T-W-5 T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4	M-1	S-1 S-2

Required reading

1. T. Brandt, S. TH. Franssen, Basics tendering, Birkhauser, 2017

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Current Developments in Civil Engineering and Built Environment**		
Code	WBIA/S2CE/ICM/D/04		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
discussion sessions	K	1	15	1,5	0,50	credits
lecture	W	1	30	1,5	0,50	examination

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	Kaszyńska Maria (Maria.Kaszynska@zut.edu.pl), Kurtz-Orecka Karolina (Karolina.Kurtz@zut.edu.pl), Nauczyciel WBiA - (a@b), Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Wygocka-Domagałło Agata (Agata.Wygocka@zut.edu.pl)

Prerequisites	
W-1	English language at level B2
W-2	1st cycle diploma in civil engineering

Module/course unit objectives	
C-1	The aim is to provide the student with contemporary topics relevant to new developments in construction industry with reference to technologies, materials, softaware available on the market

Course content divided into various forms of instruction		*Number of hours*
T-K-1	Discussion on advantages and disadvantages of new materials, systems and technologies used in civil engineering industry. Written report with characteristics of given technology, system and materials.	15
T-W-1	New technologies in concrete structures, new generation concrete, 3d printing of concrete elements, new systems of excavations support, anchoring and bracing systems, modern materials in civil engineering, new sealing systems, sustainable building and passive houses technologies, new systems of flood protection and water management, new developed software systems in CAD and construction management, new trends in civil engineering materials and technologies	30

Student workload - forms of activity		*Number of hours*
A-K-1	Presence in classes	15
A-K-2	Searching in data bases and in internet, desk study	14
A-K-3	Consultancies	4
A-K-4	Preparation of report and pass the subject	6
A-K-5	overview of companies offer from the sector of civil engineering	5
A-W-1	Presence on lectures	30
A-W-2	Desk study on new technologies in civil engineering	10
A-W-3	Consultancies and discussions	3
A-W-4	Examination	2

Teaching methods / tools	
M-1	lecture
M-2	interactive lecture and discussion

Evaluation methods (F - progressive, P - final)		
S-1	F	permanent assessment of student's activity
S-2	P	Discussion on basis of prepared report and discussion

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/03_W01 Student is familiar with new developed technologies, materials, computer systems used in civil engineering. Knows new trends and achievements in building industry.	B-A_2A_W09 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1	T-K-1 T-W-1	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ICM/D/03_U01 Student is able to estimate possibilty to use in construction new developed materials, technologies and computer software.	B-A_2A_U19	P7S_UW_TA24		C-1	T-K-1 T-W-1	M-1 M-2	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/03_K01 Student understands the necessity of assessment new technologies, materials and software used in modern construction methods with respect to sustainable development.	B-A_2A_K04 B-A_2A_K06	P7S_KK P7S_KR		C-1	T-K-1 T-W-1	M-1 M-2	S-1 S-2

Required reading

1. Scientific and professional journals in the area of civil engineering

2. Civil Engineering and Construction Materials, Knovel System

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Advanced Concrete Structures – International Perspective**		
Code	WBIA/S2CE/ICM/D/05		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Konstrukcji Żelbetowych i Technologii Betonu		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	0,8	0,50	credits
lecture	W	1	30	1,2	0,50	credits

Leading teacher	Kiernożycki Włodzimierz (Wlodzimierz.Kiernozycki@zut.edu.pl)
Other teachers	Brzozowski Piotr (Piotr.Brzozowski@zut.edu.pl), Kaszyńska Maria (Maria.Kaszynska@zut.edu.pl), Olczyk Norbert (Norbert.Olczyk@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Zielinski Adam (Adam.Zielinski@zut.edu.pl)

Prerequisites

W-1	Basic knowledge on the building materials and concrete technology

Module/course unit objectives

C-1	Basic knowledge on the building materials and concrete technology
C-2	Getting to know modern methods of testing the properties of mixtures and hardened concrete
C-3	Getting to know composition of the concrete methods of design of a new generation

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of modern concreto mixes	15
T-W-1	New generation of concrete principles. Comparison the composition of ordinary concrete and new generation of concrete. Effect of additions and admixtures on concrete properties. Applications. Self-consolidating concrete, mix composition, test methods. Characteristic of fibre-reinforced concreto. Shotcreate. Architectural concreto.	30

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in lectures	15
A-P-2	Preparation of the projectPreparation of the project	9
A-W-1	Participation in lectures	30
A-W-2	Completion of the course	5

Teaching methods / tools

M-1	Lecture information
M-2	Lecture with multimedia presentation

Evaluation methods (F - progressive, P - final)

S-1	P	Written test
S-2	P	Controlled assessment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_ICM/D/04_W01 Has a basic knowledge about modern construction materials. Knows the bases for mix design. Knows the additives and chemical admixtures. Knows test methods for mortars, concrete mixes and hardened concrete	B-A_2A_W06 B-A_2A_W12	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2 C-3	T-P-1 T-W-1	M-1 M-2	S-1 S-2

Skills							
CE_2A_ICM/D/04_U01 Can select the components of the new generation mix, test the properties and compare the results with Standards. Can design a mix for special use	B-A_2A_U09 B-A_2A_U11 B-A_2A_U13	P7S_UK P7S_UO P7S_UW_TA21 P7S_UW_TA22 P7S_UW_TA23	P7S_UW_IA21	C-1 C-2 C-3	T-P-1 T-W-1	M-1 M-2	S-1 S-2
Other social / personal competences							
CE_2A_ICM/D/04_K01 Understands the need for constant improvement of the knowledge of modern concretes. Understands the responsibilities for test results and their influence on further decisions.	B-A_2A_K01 B-A_2A_K03	P7S_KK		C-1 C-2 C-3	T-P-1 T-W-1	M-1 M-2	S-1 S-2

Required reading

1. Neville A., Properties of Concrete, London, 2012

2. Aitcin P.C., High-Performance Concrete., E&FN SPON, 1998

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Construction Technologies**		
Code	WBIA/S2CE/ICM/D/06		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,5	0,50	credits
lecture	W	1	30	1,5	0,50	credits

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	Abramowicz Małgorzata (Malgorzata.Abramowicz@zut.edu.pl), Nauczyciel WBiA - (a@b), Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Basics of civil engineering

Module/course unit objectives

C-1	Familiarize the student with various technologies for the execution of construction works
C-2	Familiarize the student with the issues of development of the construction site

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Project of development of the construction site for earthworks in complex geotechnical conditions	15
T-W-1	Introduction to the various construction systems	2
T-W-2	Stages for construction: Building	2
T-W-3	Stages for construction: Retaining wall	2
T-W-4	Stages for construction: Drainage	2
T-W-5	Stages for construction: Road & Highway	2
T-W-6	Stages for construction: Bridges	2
T-W-7	Stages for maintenance works: Buildings	2
T-W-8	Stages for maintenance works: Roads	2
T-W-9	Construction plants :Principles and factors of plant selections Types, functions, capabilities and selection of moving machines. Idustrial safety on building site, individual and staff safety in construction works.	4
T-W-10	Temporary works : Function, types and construction of formwork	2
T-W-11	Temporary works : Function, types and construction of Scaffolding, Shoring	2
T-W-12	Permanent work Reinforced Concrete Technology - Precast Concrete - Piling - Brick laying	2
T-W-13	Latest Technology Trenchless Technology Ground Improvement	2
T-W-14	Latest Technology BIM GREEN BUILDING GREEN CONSTRUCTION	2

Student workload - forms of activity		*Number of hours*
A-P-1	participation in classes	15
A-P-2	Own design project work	30

Student workload - forms of activity		*Number of hours*
A-W-1	Presence at the class	30
A-W-2	Own work wit literature	5
A-W-3	Final test preparation	5
A-W-4	Design Project preparation and consult	5

Teaching methods / tools	
M-1	Information Lecture
M-2	Case study Lecture
M-3	Project method

Evaluation methods (F - progressive, P - final)		
S-1	P	Student must prepare design project of site development plan for chosen engineering scope of works
S-2	P	Student must pass the test from lectures, and take live participation in class discussion

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/05_W01 He knows the requirements, general recommendations and rules for the performance of small-volume objects and the issues of construction and material shaping of high-rise buildings.	B-A_2A_W08 B-A_2A_W10 B-A_2A_W11 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-W-1 T-W-8 T-W-2 T-W-9 T-W-3 T-W-10 T-W-4 T-W-11 T-W-5 T-W-12 T-W-6 T-W-13 T-W-7 T-W-14	M-1 M-2	S-2
Skills							
B-A_2A_ICM/D/05_U01 He knows the basics of designing and dimensioning and collecting information from all available sources, make their critical analysis and selection of the best methods of task implementation.	B-A_2A_U01 B-A_2A_U21 B-A_2A_U24 B-A_2A_U26	P7S_UK P7S_UU P7S_UW_TA22 P7S_UW_TA24		C-1 C-2	T-P-1	M-1 M-2 M-3	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/05_K01 Understands the impact of construction activities on the natural environment and man in the aspect of sustainable development and the necessity of continuing independent learning and expanding knowledge in the field of modern technologies and material and construction solutions in construction	B-A_2A_K04 B-A_2A_K06	P7S_KK P7S_KR		C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7	M-1 M-2 M-3	S-1 S-2

Required reading

1. Eric Fleming, Construction Technology: An Illustrated Introduction, 2005

Supplementary reading

1. Roy Chudler, Construction technology, 1973

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Applied Construction Management**		
Code	WBIA/S2CE/ICM/D/07		
Field of specialisation	International Construction Management		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	1	15	1,0	0,50	credits
lecture	W	1	15	1,0	0,50	credits

Leading teacher	Bochenek Magdalena (Magdalena.Bochenek@zut.edu.pl)
Other teachers	

Prerequisites

W-1	Basic knowledge of construction technology and construction materials.

Module/course unit objectives

C-1	Upon completion of this course the student will be able to use the applied tools and techniques of Construction Management during the construction stage of the project whilst developing management solutions for a variety of construction problems

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Case Studies of some construction management projects	15
T-W-1	Construction procedures and strategies	1
T-W-2	Planning and control	5
T-W-3	Lean construction	2
T-W-4	Information management	2
T-W-5	Environmental management	2
T-W-6	Risk management in construction	3

Student workload - forms of activity		*Number of hours*
A-P-1	Class Participation	15
A-P-2	Exercise preparation	15
A-W-1	Class Participation	15
A-W-2	Independent analysis of lecture content and literature recognition	7
A-W-3	Preparation for the exam	7
A-W-4	Final exam	1

Teaching methods / tools

M-1	Lecture, case studies

Evaluation methods (F - progressive, P - final)

S-1	F	continuous assessment
S-2	P	written exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							

CE_2A_ICM/D/06_W01 Student has the knowledge of tools and techniques of Construction Management during the construction stage of the project whilst developing management solutions for a variety of construction problems.	B-A_2A_W14	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1	S-1 S-2
Skills							
CE_2A_ICM/D/06_U01 Student is able to: analyze and control construction process	B-A_2A_U23	P7S_UW_TA23		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-2
Other social / personal competences							
CE_2A_ICM/D/06_K01 Student is able in both professional and responsible way use gained knowledge and skills in executions works associated with construction management	B-A_2A_K06	P7S_KR		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1	S-1 S-2

Required reading

1. Daniel W. Halpin, Bolivar A. Senior, Gunnar Lucko, Construction management, Wiley, 2017

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Sustainable Design and Environmental Engineering**		
Code	WBIA/S2CE/ICM/D/10-1		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Mieszkalnictwa i Podstaw Techniczno-Ekologicznych Architektury		
ECTS	4,0	*ECTS (forms)*	4,0
Form of course credit	examination	*Language*	english
Electives	7	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	30	2,0	0,50	credits
lecture	W	2	30	2,0	0,50	examination

Leading teacher	Januszkiewicz Krystyna (Krystyna.Januszkiewicz@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl)

Prerequisites	
W-1	Intermediate skills in structural design. Basic knowledge of the philosophy of designing physical objects, the built environment, and services to comply with the principles of social, economic, and ecological sustainability.

Module/course unit objectives	
C-1	The aim of the course is exploring innovative solutions to problems in air, water, and land contamination and waste disposal, with coverage of climate change, environmental risk assessment and management, green technologies, sustainability, and environmental policy. This multidisciplinary field is requiring an integration of physical, chemical and biological principles with engineering analysis for environmental protection and restoration.
C-2	The multidisciplinary approach in Environmental Engineering gives the student expertise in technical fields related to their own personal interest. The main mission of this course is to build the designers own interpretation and implementation of environmental systems thinking.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	The task is to design an environmental structure to an air purification in highly- urbanized area with use TiO2; public use object in a municipaliity with an attractive busy city landscape, e.g. the city of Szczecin.	30
T-W-1	What is the intention of sustainable design - how to "eliminate negative environmental impact completely through skillful sensitive design" - the basic principles.	2
T-W-2	The Philosophy of Sustainable Design - designing for the Environment - the sustainable buildings and the environmentally-friendly architecture.	2
T-W-3	Energy aspects in sustainable design - renewable energy sources.	2
T-W-4	The multi-criteria evaluation of design solutions using specialized computer programs in the process of sustainable design. The building information modeling (BIM) as a means of increasing total project quality, providing accurate quantity take-offs, and improving scheduling, consequently diminishing total project contingencies and costs.	2
T-W-5	What is the intention of environmental engineering - exploring innovative solutions to problems in air, water, and land contamination and waste disposal, with coverage of climate change, environmental risk assessment and management, green technologies, sustainability, and environmental policy.	2
T-W-6	The climate change oriented design defined as an adjustment of conditions compatible with changeable climate characteristics and ecology- methods and practice - case study.	2
T-W-7	The low-carbon building - different approaches to assessing the criteria of what constitutes a low-carbon building.	2
T-W-8	An experimental and CFD investigation into the mixing in a closed system to reduce wind loads for a particular building.	2
T-W-9	The Climate responsive building envelopes - an attempt to understand and quantify the effect of different parameters like building materials, orientation, percentage fenestrations, help the designers to try different combinations of these building parameters help the designers to try different combinations of these building parameters to reduce heat loads for a particular building.	2
T-W-10	The climate responsive building design strategies and their barriers such as: the innovative character and the lack of dedicated knowledge on the synthesis of design, building performance and implementation in the design process.	2
T-W-11	The strategies that address to reducing energy consumption and providing a comfortable and healthy environment during the Climate change era (retrieving renewable energy resources.	2

Course content divided into various forms of instruction		*Number of hours*
T-W-12	Air and water pollutions a worldwide problem - research review into an air and water purification in big cities.	2
T-W-13	The global climate change - disasters and hazards - infrastructures to harvester plants reduce disaster's impact to cities - designs form mobility.	2
T-W-14	The global climate change - rainwater harvester issues - infrastructures to collect rainwater in a big cities and agriculture water problems.	2
T-W-15	The global climate change - food security - infrastructures to an agricultural production in a big cities - vertical farming.	2

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in lectures	30
A-P-2	Design work	30
A-W-1	Participation in lectures and participation in discussions	30
A-W-2	The study required and supplementary readings	30

Teaching methods / tools	
M-1	Lectures with Power Point presentations by the subject leader. Additionally, the discussion with the current thinking on solutions to problems in air, water, and land contamination and waste disposal, with coverage of climate change, environmental risk assessment and management, green technologies, sustainability, and environmental policy.
M-2	The central teaching strategy associated with the design process is regular, tutor-led, design tutorials in which each student or team present ongoing projects work, discuss and evaluate these results.

Evaluation methods (F - progressive, P - final)		
S-1	P	Exam
S-2	P	Execution of design project

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/11-2_W01 Knows technical and technological conditions of Sustainable Design and Environmental Engineering their practice. Understands basic principles and spatial relations in the sustainable structural design.	B-A_2A_W02 B-A_2A_W05	P7S_WG_TA21	P7S_WG_IA21	C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ICM/D/11-2_U01 Is able to adjust the methods if the Sustainable Design and Environmental Engineering to a building design task, experiments and uses computer software. In his/her work, pursues an individual engineer attitude which is manifested through his/her approach to reality the sustainable develionebt and the environmental design.	B-A_2A_U11 B-A_2A_U16	P7S_UK P7S_UW_TA24		C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15	M-1 M-2	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/11-2_K01 The student is poor in demonstration of an ability to evaluate and critically assess specific Sustainable Design and Environmental Engineering design outcomes.	B-A_2A_K03	P7S_KK		C-1 C-2	T-P-1 T-W-8 T-W-1 T-W-9 T-W-2 T-W-10 T-W-3 T-W-11 T-W-4 T-W-12 T-W-5 T-W-13 T-W-6 T-W-14 T-W-7 T-W-15	M-1 M-2	S-1 S-2

Required reading

1. Januszkiewicz K., Multi-layer structural "skins", Case of Study, 2014, Archivolta No. pp. 52-57.

2. McLennan J.F., The Philosophy of Sustainable Design: The Future of Architecture, Ecotone Publishing, 2004

3. Setchi R., Howlett R.J., Naim M. Seinz H.,, Sustainable Design and Manufacturing Part 1, Lulu.com, 2014

4. Nazaroff W.W., Alvarez-Cohen L., Environmental Engineering Science, John Wiley and Sons, London, 2014

5. Guy S., Moore S. A., Sustainable Architectures: Critical Explorations of Green Building Practice in Europe and North America, Routledge, 2014

6. Wurbs R., James W. P., Water Resources Engineering, John Wiley and Sons, London, 2001

7. Januszkiewicz K. and Paszkowska N. E., Climate change adopted building envelope for the urban environment. A new approach to architectural design, Go Green, Vienna, 2016, Vol. III, Book 6, Nano, Bio and Green Technologies for a sustainable Future

8. Januszkiewicz K., Jarmusz M., Envisioning Urban Farming for Food Security during the Climate Change Era. Vertical Farm within Highly Urbanized Areas, IOP Conf. Ser.: Mater. Sci. Eng., 2017

Supplementary reading

1. Januszkiewicz K., A Climate Change adopted building envelope as a protector of Human Health in the urban environment, IOP Conf. Ser.: Mater. Sci. Eng. 245 052094, 2017

2. Wurbs R., James W. P., Water Resources Engineering, John Wiley and Sons, London, 2008

3. Goia F., Perino M., Serra V., Zanghirella F., Towards an active, responsive, and solar building envelope, Journal of Green Building, 2011, No. 4, vol.5, pp. 121-136.

Supplementary reading
4. Velikov K., Thün G, Responsive Building Envelopes: Characteristics and Evolving Paradigms. In Design and Construction of High Performance Homes, Routledge Press, London, 2012, pp. 75-91.
5. Journal of Environmental Engineering and Science, 2011, ISSN 1496-2551 | E-ISSN 1496-256X

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Sustainable Design and Environmental Engineering**		
Code	WBIA/S2CE/ICM/D/10-2		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Fizyki Budowli i Materiałów Budowlanych		
ECTS	4,0	*ECTS (forms)*	4,0
Form of course credit	examination	*Language*	english
Electives	7	*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	30	2,0	0,50	credits
lecture	W	2	30	2,0	0,50	examination

Leading teacher	Kurtz-Orecka Karolina (Karolina.Kurtz@zut.edu.pl)
Other teachers	Strzałkowski Jarosław (Jaroslaw.Strzalkowski@zut.edu.pl), Wygocka-Domagałło Agata (Agata.Wygocka@zut.edu.pl)

Prerequisites	
W-1	Building Materials, Civil Engineering

Module/course unit objectives	
C-1	Knowledge of design challenges for a changing climate - Knowledge of modern low-energy buildings design standards - Understanding of building energy demands and influance of therma bridges on hygrothermal behavior of partitions - Understanding the importance of energy models in design
C-2	Skills of defining main energy demands of building according to its features - Skills of finding proper solutions for construction for different climates - Ability to create strategies of energy efficiency increment of buildings and their services and decreasement of building environmental impact - dwellings, commercial and institutional buildings

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design for sustainability - design for climate change	30
T-W-1	Sustainable development	2
T-W-2	Climate change and challenges for the building environment	2
T-W-3	Contemporary low-energy building standards	2
T-W-4	Building energy demands	4
T-W-5	Thermal bridges in construction - Computation of linear thermal bridge coefficient - Thermal and moisture control of thermal bridges	4
T-W-6	Sankey diagrams - Building thermal energy model	2
T-W-7	Use of renewable resources - energy and materials	2
T-W-8	Strategies of energy efficiency increment of buildings and their services and decreasement of building environmental impact - dwellings, commercial and institutional buildings	6
T-W-9	Design for sustainability - design for climate change	6

Student workload - forms of activity		*Number of hours*
A-P-1	Classes participation	30
A-P-2	Project work	25
A-P-3	Preparing for project presentation	5
A-W-1	Classes participation	30
A-W-2	Essays preparation	15
A-W-3	Preparing for the exam	15

Teaching methods / tools	
M-1	Lecture
M-2	Project work
M-3	Essays

Teaching methods / tools	
M-4	Oral presentation

Evaluation methods (F - progressive, P - final)		
S-1	F	Project work
S-2	F	Essays
S-3	F	Oral presentation
S-4	P	Written exam
S-5	P	Project work

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/11-3_W01 Has the knowledge of design challenges for a changing climate - knowledge of modern low-energy buildings design standards - understands of building energy demands and influance of therma bridges on hygrothermal behavior of partitions - understands the importance of energy models in design	B-A_2A_W05 B-A_2A_W09 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5	M-1 M-3	S-2 S-4
Skills							
B-A_2A_ICM/D/11-3_U01 Has skills of defining main energy demands of building according to its features, skills of finding proper solutions for construction for different climates, has ability to create strategies of energy efficiency increment of buildings and their services and decreasement of building environmental impact - dwellings, commercial and institutional buildings	B-A_2A_U01 B-A_2A_U09 B-A_2A_U10	P7S_UK P7S_UW_TA21	P7S_UW_IA21	C-2	T-P-1 T-W-6 T-W-3 T-W-8 T-W-5	M-2 M-4	S-1 S-3
Other social / personal competences							
B-A_2A_ICM/D/11-3_K01 Is able professionally define, classify and apply the priorities used for accomplishment of an undertaken engineering task	B-A_2A_K01	P7S_KK		C-1 C-2	T-P-1 T-W-6 T-W-1 T-W-7 T-W-2 T-W-8 T-W-5 T-W-9	M-2 M-3	S-2 S-5

Required reading

1. Edwards B., Rough Guide to Sustainability - 3rd Edition, RIBA Pablishing, London, 2010

2. Guzowski M., Towards Zero-energy Architecture - New Solar Design, Laurence King Publishing, London, 2010

3. Hegger M., Fuchs M., Stark T., Zeumer M., Energy Manual. Sustainable Architecture - Edition Detail, Birkhäuser, Basel, Boston, Berlin, 2008

4. Jonstone D., Gibson S., Toward a Zero Energy Home - A complete Guide to Energy Self-Sufficiency at Home, The Taunton Press, Newtown, 2010

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Innovative Developments in Construction**		
Code	WBIA/S2CE/ICM/D/11		
Field of specialisation	International Construction Management		
Administering faculty	Zakład Teorii Konstrukcji		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,5	0,50	credits
lecture	W	2	30	1,5	0,50	examination

Leading teacher	Wróblewski Tomasz (Tomasz.Wroblewski@zut.edu.pl)
Other teachers	Abramowicz Małgorzata (Malgorzata.Abramowicz@zut.edu.pl), Pełka-Sawenko Agnieszka (Agnieszka.Pelka-Sawenko@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Knowledge of basic issues in the field of concrete technology and 3D CAD modeling

Module/course unit objectives

C-1	Critical and coherent understanding of the alternative principles of construction.

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design of the 3D printed prefabricated construction element	15
T-W-1	Detailed 3D BIM modeling	6
T-W-2	Modern pre-fabrication	6
T-W-3	3D printing in construction	6
T-W-4	Construction-Site Robots	6
T-W-5	Virtual and Augumented Reality applications for construction	6

Student workload - forms of activity		*Number of hours*
A-P-1	Participation in classes	15
A-P-2	Individual preparation of design assignment	30
A-W-1	Participation in lectures	30
A-W-2	Literature study	10
A-W-3	Taking an exam	5

Teaching methods / tools

M-1	Lecture
M-2	Project

Evaluation methods (F - progressive, P - final)

S-1	P	Passing the exam
S-2	P	Passing the controlled assignment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
CE_2A_ICM/D/07_W01 The student has knowledge of innovative solutions used in the construction of engineering structures	B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3	M-1	S-1
Skills							

CE_2A_ICM/D/07_U01 The student is able to apply innovative solutions for the design of prefabricated structural elements	B-A_2A_U19	P7S_UW_TA24		C-1	T-P-1	M-2	S-2
Other social / personal competences							
CE_2A_ICM/D/07_K01 Student has awareness of the need for individual studying and upgrading professional skills	B-A_2A_K02 B-A_2A_K03	P7S_KK		C-1	T-P-1 T-W-3 T-W-1 T-W-4 T-W-2 T-W-5	M-1 M-2	S-1 S-2

Required reading

1. Andrew Watts, Modern Construction Handbook, SpringerWienNewYork, 2007

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Advanced Geoengineering**		
Code	WBIA/S2CE/ICM/D/12		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	15	1,0	0,50	credits

Leading teacher	Meyer Zygmunt (Zygmunt.Meyer@zut.edu.pl)
Other teachers	Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl)

Prerequisites

W-1	Advanced soil mechanics
W-2	Basic of buliding mechanics

Module/course unit objectives

C-1	Familiarize the student with various foundation load systems, teach him how to design special foundation elements in complex geotechnical conditions

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Project of the foundation of the building segment	15
T-W-1	Cooperation of the slab with the pile system	2
T-W-2	Box foundations	2
T-W-3	Foundation of high objects under complex load conditions and difficult geotechnical conditions in category III (high buildings, masts, wind power towers)	3
T-W-4	Designing foundations for machines	3
T-W-5	Foundation of communication engineering objects (bridges, viaducts, embankments, deep excavations, underground constructions)	3
T-W-6	Foundation of hydrotechnical construction objects (wharfs, locks, weirs, breakwaters)	2

Student workload - forms of activity		*Number of hours*
A-P-1	participation in classes	15
A-P-2	Design project of special foundation	15
A-W-1	participation in classes	15
A-W-2	Own work with literature	5
A-W-3	Final test preparation	10

Teaching methods / tools

M-1	Information lecture method
M-2	Case study lecture method
M-3	Pracitical desing project method

Evaluation methods (F - progressive, P - final)

S-1	F	Countinous rating of student progress
S-2	P	Final test rating

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods

Knowledge							
B-A_2A_ICM/D/08_W01 Student has a thorough knowledge in the field of foundation of objects in variable load conditions and in complex geotechnical conditions. He knows the principles of constructing and dimensioning the foundations of complex structures and building objects.	B-A_2A_W01 B-A_2A_W06 B-A_2A_W09 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3 T-W-6	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ICM/D/08_U01 Is able to solve the problems of founding simple and complex buildings in difficult geotechnical conditions by integrating knowledge in the field of various branches of science related to construction	B-A_2A_U01 B-A_2A_U09	P7S_UK P7S_UW_TA21	P7S_UW_IA21	C-1	T-P-1	M-3	S-1
Other social / personal competences							
B-A_2A_ICM/D/08_K01 Student is able to apply the knowledge used in the implementation of the engineering task undertaken in a responsible and professional manner	B-A_2A_K01 B-A_2A_K02	P7S_KK		C-1	T-P-1 T-W-4 T-W-1 T-W-5 T-W-2 T-W-6 T-W-3	M-1 M-2 M-3	S-1 S-2

Required reading

1. Braja M Das, Introduction to Geotechnical Engineering, 1985

Supplementary reading

1. German Geotechnical Society, EBGEO- Desing with geosynthetics, Willey and Sohn, 2010

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**International Construction**		
Code	WBIA/S2CE/ICM/D/13		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecturing course	A	2	30	1,5	0,50	credits
lecture	W	2	15	1,5	0,50	examination

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	Nauczyciel WBiA - (a@b), Visiting Professor (Visiting@zut.edu.pl), Wróblewski Tomasz (Tomasz.Wroblewski@zut.edu.pl)

Prerequisites	
W-1	Basic knowledge of economical, social, environmental issues in international perspective

Module/course unit objectives	
C-1	to develop international perspective of design and construction
C-2	to widen students knowledge of construction sector in developed and developing countries

Course content divided into various forms of instruction		*Number of hours*
T-A-1	Searching internet souces and identifying main issues in international construction market, examples of good practices for construction companies operating internationally, prepare a written report on chosen company achievements. Management of international project on discussed examples.	30
T-W-1	International construction market in developed and developing countries. Effect of local and global economy on construction sector. Social and environmental issues from construction company perspective in foreign conditions. Construction law aspects, construction joint ventures, partnership, strategic alliances. How to develop competitive strategy for international construction. Basic aspects of managing international projects. Case studies	15

Student workload - forms of activity		*Number of hours*
A-A-1	Attending the tutorials	30
A-A-2	Desk study with internet data bases and literature sources. Check the available data for further analysis.	6
A-A-3	Preparation of written report	6
A-A-4	Consultancies and assessment of tutorials	3
A-W-1	Attendance on lectures	15
A-W-2	Desk study in the field of international aspects of construction company, structure, management.	8
A-W-3	consulting with teacher	4
A-W-4	Preparation for examination	6
A-W-5	Search in literature sources, internet data bases	10
A-W-6	Oral examination and discussion on chosen issues	2

Teaching methods / tools	
M-1	lecture method
M-2	interactive lecture and problem method
M-3	seminar and discussion

Evaluation methods (F - progressive, P - final)		
S-1	F	forming
S-2	P	final assessment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/09_W01 To give information to widen horizons about global civil engineering and construction markets. To recognize main aspects of organizing construction company in international environment.	B-A_2A_W07 B-A_2A_W14	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1 C-2	T-A-1 T-W-1	M-1 M-2 M-3	S-1 S-2
Skills							
B-A_2A_ICM/D/09_U01 student is able to recognize main aspects of international market in civil engineering and understands principal rules of running projects internationally	B-A_2A_U16 B-A_2A_U24	P7S_UW_TA22 P7S_UW_TA24		C-1 C-2	T-A-1 T-W-1	M-1 M-2 M-3	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/09_K01 Student understands the need to recognize main problems in construction industry and is able to communicate with international society.	B-A_2A_K08	P7S_KO		C-1 C-2	T-A-1 T-W-1	M-1 M-2 M-3	S-2

Required reading

1. Knovel Data Base in Construction Management

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Underground Structures**		
Code	WBIA/S2CE/ICM/D/14		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
project course	P	2	15	1,0	0,50	credits
lecture	W	2	30	1,0	0,50	credits

Leading teacher	Meyer Zygmunt (Zygmunt.Meyer@zut.edu.pl)
Other teachers	Meyer Zygmunt (Zygmunt.Meyer@zut.edu.pl), Szmechel Grzegorz (Grzegorz.Szmechel@zut.edu.pl), Visiting Professor (Visiting@zut.edu.pl), Żarkiewicz Krzysztof (Krzysztof.Zarkiewicz@zut.edu.pl)

Prerequisites

W-1	Basic of soil mechanics and geotechnical engineering

Module/course unit objectives

C-1	Acquainting the student with complex problems of designing of the underground structures

Course content divided into various forms of instruction		*Number of hours*
T-P-1	Design exercises from underground structures. Design of tunnel elements. Rocks pressure calculations. Designing of support system and tunnel construction process.	15
T-W-1	Introduction to undeground structures. Types of undeground structures.	4
T-W-2	Shape of the cross section. Excavation and support systems.	2
T-W-3	Methods of tunneling and underground structures constructions.	4
T-W-4	Opencast methods. Excavation methods. New Austrian Tunneling Method. Continuous mechanised tunneling: TBM technologies.	6
T-W-5	Rock behaviour in tunneling design.	4
T-W-6	Monitoring and risk management in underground constructions.	2
T-W-7	Safety and ventilation of tunnels. Technical infrastructure, lighting, monitoring.	4
T-W-8	Tunnel designing. Soils and rocks pressure on support systems.	2
T-W-9	Socio-economic advantages of udergrounds structures. Tunnels impact on the environment.	2

Student workload - forms of activity		*Number of hours*
A-P-1	Presence at class	15
A-P-2	Design project of underground structure.	15
A-W-1	Presence at class	15
A-W-2	Own work with literature	5
A-W-3	Presentation has to be prepared by student	5
A-W-4	Preparation for final test exam	5

Teaching methods / tools

M-1	Lectures method
M-2	Project design method

Evaluation methods (F - progressive, P - final)

S-1	F	Countinous rating of student progress
S-2	P	Test exam

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/10_W01 The student learns to solve complex geotechnical problems by himself by extending his knowledge about soil and rock mechanics and underground structures	B-A_2A_W05 B-A_2A_W07 B-A_2A_W08 B-A_2A_W10 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-4 T-W-2 T-W-5 T-W-3	M-1 M-2	S-1 S-2
Skills							
B-A_2A_ICM/D/10_U01 Student can design the underground structures in complex geotechnical conditions	B-A_2A_U01 B-A_2A_U11 B-A_2A_U16	P7S_UK P7S_UW_TA24		C-1	T-W-6 T-W-8	M-2	S-1
Other social / personal competences							
B-A_2A_ICM/D/10_K01 He can work with a group to achieve the desired engeneering effect.	B-A_2A_K03 B-A_2A_K04	P7S_KK		C-1	T-W-9	M-1 M-2	S-1

Required reading

1. Pietro Lunardi, Design and construction of tunnels, Springer-Verlag Berlin Heidelberg, Italy, 2008

3. Otis Williams, Engineering and Design TUNNELS AND SHAFTS IN ROCK, Department of the Army U.S. Army Corps of Engineers Washington, Washington, 1997

4. ITA WG Mechanized Tunnelling, Recommendations and Guidelines for Tunnel Boring Machines (TBMs), by ITA - AITES, www.ita-aites.org, 2000

5. John A. Hudson, John P. Harrison, Engineering Rock Mechanics. An Introduction for the Principles, ELSEVIER SCIENCE, Amsterdam - Lausanne - New York - Oxford - Shannon - Singapore - Tokyo, 1997

Supplementary reading

2. Giulia Viggiani, Geotechnical Aspects of Underground Construction in Soft Ground, CRC Preis Taylor & Francis, New York, 2013

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Strategic Management in Construction**		
Code	WBIA/S2CE/ICM/D/15		
Field of specialisation	International Construction Management		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	examination	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecturing course	A	2	30	1,5	0,50	credits
lecture	W	2	30	1,5	0,50	examination

Leading teacher	Araszkiewicz Krystyna (Krystyna.Araszkiewicz@zut.edu.pl)
Other teachers	Sikora Paweł (Pawel.Sikora@zut.edu.pl)

Prerequisites

W-1	Knowledge of the basics of management

Module/course unit objectives

C-1	To be able to differentiate basic theories from strategic management, to discuss them, to conduct analyses on industry forces and business model conceptions and to scrutinize selected issues of modern top management

Course content divided into various forms of instruction		*Number of hours*
T-A-1	Preparation of the macro-environment analysis of the selected company	8
T-A-2	Preparation of the chosen company's strategy	10
T-A-3	Case studies – strategies of selected companies from construction industry	8
T-A-4	Marketing plan for a selected company from the construction industry	3
T-A-5	Completion of the excercisers	1
T-W-1	Introduction to the course: Competitive advantages and business models	2
T-W-2	Review of the main schools of thought about strategy making	4
T-W-3	Developing new business models	4
T-W-4	Corporate diversification: The concept of relatedness	2
T-W-5	Industry analysis and new business models in the construction industry	4
T-W-6	Strategic and cultural change – the case studies	3
T-W-7	Developing and implementing sustainable strategies (and business models)	2
T-W-8	The role of top management teams	2
T-W-9	Supply chain analysis. Techniques for strategic planning.	4
T-W-10	Marketing in construction industry – international aspects	2
T-W-11	Completion of the lectures	1

Student workload - forms of activity		*Number of hours*
A-A-1	Participation in the classes	30
A-A-2	Own work, self-study, Preparation for completion of the excersises	15
A-W-1	Participation in classes, completion of the lectures	30
A-W-2	self - study	10
A-W-3	self-preparation for completion of the lectures	5

Teaching methods / tools

M-1	Informative lecture, explanation
M-2	case studies

Teaching methods / tools	
M-3	project based learning method

Evaluation methods (F - progressive, P - final)		
S-1	F	written test
S-2	F	project appraisal

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/12_W01 The student knows and understands the basic concepts and methods of managing a strategic construction company	B-A_2A_W14	P7S_WK_TA21	P7S_WK_IA21	C-1	T-W-1 T-W-6 T-W-2 T-W-7 T-W-3 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1 M-2	S-1
Skills							
B-A_2A_ICM/D/12_U01 The student can apply methods of analysis of the environment and analysis of enterprise resources	B-A_2A_U01	P7S_UK		C-1	T-A-1 T-W-4 T-A-2 T-W-5 T-A-3 T-W-6 T-A-4 T-W-7 T-W-1 T-W-8 T-W-2 T-W-9 T-W-3 T-W-10	M-1 M-2 M-3	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/12_K01 The student demonstrates creativity in solving strategic problems in a construction company	B-A_2A_K05	P7S_KO		C-1	T-A-1 T-A-3 T-A-2 T-A-4	M-1 M-2 M-3	S-1 S-2

Required reading

1. Langford D. and Retik A., The Organization and Management of Construction: Shaping theory and practice, Routledge, 2002

2. Lester A., Project management, planning and control: managing engineering, construction and manufacturing projects to PMI, APM and BSI standards, Elsevier, 2006

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**BIM in Construction Management**		
Code	WBIA/S2CE/ICM/D/16		
Field of specialisation	International Construction Management		
Administering faculty	Zespół Dydaktyczny Ekonomiki, Organizacji i Zarządzania w Budownictwie		
ECTS	3,0	*ECTS (forms)*	3,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
laboratory course	L	3	30	1,5	0,50	credits
lecture	W	3	15	1,5	0,50	credits

Leading teacher	Araszkiewicz Krystyna (Krystyna.Araszkiewicz@zut.edu.pl)
Other teachers	

Prerequisites

W-1	none

Module/course unit objectives

C-1	Understanding principles of the Building Information Modelling in a context of construction project management and information management in construction project lifecycle

Course content divided into various forms of instruction		*Number of hours*
T-L-1	Introduction to the Course. Review of software tools	2
T-L-2	Organization of the work of the project team: preparation of the BEP, determination of LOD levels. Supporting the use of classification systems. Configuration of network services to share shares for the needs of a central data repository	4
T-L-3	Technical project of a residential building in BIM technology	12
T-L-4	Clash detection and interoperability	1
T-L-5	Selected analyzes of the created BIM model (work schedule, bill of materials, cost analysis and energy analysis)	6
T-L-6	Mobile project management on the construction site, exchange of comments, revision of the version	3
T-L-7	Presentations of projects	2
T-W-1	Information management in the construction industry	2
T-W-2	Communication and team work in the construction project lifecycle	1
T-W-3	History of Building Iinformation Modelling and terminology	1
T-W-4	Integrated Product Delivery concept	1
T-W-5	BIM Standards - an overwiev	1
T-W-6	BIM as a platform for communication	1
T-W-7	Fundamental modeling techniques used in BIM	1
T-W-8	An overview of the most widely used file protocols (the IFC standard)	1
T-W-9	Collaboration, Model Sharing and Design Management	1
T-W-10	BIM and Construction Management - Coordination and Clash Detection 4-D Sequencing, Safety, Logistics and Communication	2
T-W-11	Sustainable BIM	1
T-W-12	BIM and Facility Management - basics	1
T-W-13	completion of lectures	1

Student workload - forms of activity		*Number of hours*
A-L-1	presence on lab. classes	30
A-L-2	Peparing a laboratory report	12

Student workload - forms of activity		*Number of hours*
A-L-3	Completion the subject	3
A-W-1	presence on lectures	14
A-W-2	self-study	30
A-W-3	completion of lectures	1

Teaching methods / tools	
M-1	lectures
M-2	case studies
M-3	project method

Evaluation methods (F - progressive, P - final)		
S-1	P	final test
S-2	P	project evaluation

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/13_W01 The student knows the basic models of group work in BIM systems and IT tools for their implementation. He can choose appropriate IT solutions depending on the adopted assumptions as to the nature of the work, the size of the group, the interdisciplinary group's level	B-A_2A_W09 B-A_2A_W13	P7S_WG_TA21	P7S_WG_IA21	C-1	T-W-1 T-W-7 T-W-2 T-W-8 T-W-3 T-W-9 T-W-4 T-W-10 T-W-5 T-W-11 T-W-6 T-W-12	M-1 M-2	S-1
Skills							
B-A_2A_ICM/D/13_U01 He can choose and configure IT resources, he can run the system of managing the flow of documentation, determine the rights of groups of users and individual users, he can integrate solutions of various BIM software producers. Is able to determine and implement the rules of work safety in the BIM environment	B-A_2A_U07	P7S_UW_TA22	P7S_UW_IA22	C-1	T-L-1 T-W-4 T-L-2 T-W-5 T-L-3 T-W-6 T-L-4 T-W-7 T-L-5 T-W-8 T-L-6 T-W-9 T-W-1 T-W-10 T-W-2 T-W-11 T-W-3 T-W-12	M-1 M-2 M-3	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/13_K01 The student has a deep awareness of the importance of group work. can propose and implement in the team BIM server technologies, BIM cloud technologies and other solutions for teamwork	B-A_2A_K02 B-A_2A_K05	P7S_KK P7S_KO		C-1	T-L-2 T-W-6 T-W-1 T-W-7 T-W-2 T-W-8 T-W-4 T-W-9 T-W-5 T-W-10	M-1 M-2 M-3	S-1 S-2

Required reading

1. Barnes, P., Davies, N.,, BIM in Principle and in Practice (2nd Edition), ICE Publishing, 2015

2. Eastman, C., Teicholz, P., Sacks, R. and Liston,K., BIM Handbook, a Guide to Building Information Modelling 2nd Ed., Hoboken: John Wiley & Sons, Inc., 2011

Supplementary reading

1. Brad Hardin, Dave McCool, BIM and Construction Management: Proven Tools, Methods, and Workflows, John Wiley & Sons, 2015

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**International Construction Seminar**		
Code	WBIA/S2CE/ICM/D/17		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	2,0	*ECTS (forms)*	2,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

WBiA

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
seminars	S	3	15	1,0	0,50	credits
lecture	W	3	15	1,0	0,50	credits

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl), Wróblewski Tomasz (Tomasz.Wroblewski@zut.edu.pl)

Prerequisites	
W-1	Basic knowlegde of civil engineering modules from 1st and 2nd semester

Module/course unit objectives	
C-1	To widen knowledge of all main aspects concerning management of international projects and international members of building companies

Course content divided into various forms of instruction		*Number of hours*
T-S-1	Panel discussions on selected case studies including engineering, economic, technological, environmental and social aspects	15
T-W-1	Selected international projects in Europe, Asia, Africa, Americas. Three Gorges Dam project in China - technological, environmental, sociological and economical aspects. Flood protection projects in the Netherlands, 'keep foot dry' concept, inland waters flood problems. Undersea tunnels in Korea, Europe - technologies, environmental problems. High rise buildings, geotechnical aspects, seismic activity affecting international projects. Financing international projects. Hoover Dam case study. Palm islands, rainbowing technology, sustainable development in international projects. Transfer of modern technology in civil engineering and built environment by means of construction companies operating internationally. Cultural differences while running a project in a foreign country, team work. Civil engineering technology in different climate, costs and founding problems.	15

Student workload - forms of activity		*Number of hours*
A-S-1	Attendance on seminar	15
A-S-2	Desk study on chosen cas	5
A-S-3	Consultancies	2
A-S-4	Review of case studies, conclusions on chosen aspects, written report	7
A-S-5	Completion of seminar	2
A-W-1	Attendance on lectures	15
A-W-2	Desk study on selected international projects	12
A-W-3	short report on student own point of view from presented and discussed case studies	2
A-W-4	Final assessment	1

Teaching methods / tools	
M-1	Interactive lecture
M-2	seminar
M-3	case studies method

Evaluation methods (F - progressive, P - final)		
S-1	F	forming during classes and seminar
S-2	P	Final assessment

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/14_W01 Student is able to identify main issues relevant to management of international projects and to staff memebers of a construction company from different countries. Student may recognise the world wide leading construction project with a context of economical, technological, environmental, social aspects.	B-A_2A_W12 B-A_2A_W14	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1	T-S-1 T-W-1	M-1 M-2 M-3	S-1 S-2
Skills							
B-A_2A_ICM/D/14_U01 Student is able to assess international construction project from technological, environmental, social perspective. Student is able to point main achievements in civil engineering from discussed case studies.	B-A_2A_U11 B-A_2A_U13	P7S_UK P7S_UO P7S_UW_TA22 P7S_UW_TA23		C-1	T-S-1 T-W-1	M-1 M-2 M-3	S-1 S-2
Other social / personal competences							
B-A_2A_ICM/D/14_K01 Student is aware of selected technical and non-technical aspects appearing in international project management upon discussed case studies. Student gains competencies allowing to point main cultural, ethic, social issues connected to work in international project.	B-A_2A_K03 B-A_2A_K09	P7S_KK P7S_KR		C-1	T-S-1 T-W-1	M-1 M-2 M-3	S-2

Required reading

1. Knovel Data Base - Civil Engineering and Construction Management

Zachodniopomorski Uniwersytet Technologiczny w Szczecinie

Faculty of Civil Engineering and Architecture

Field of study	Civil Engineering		
Mode of study	stationary	*Level*	second cycle
Graduate's qualification	magister		
Area(s) of study	nauki techniczne		
Educational profile	general academic		
Module			
Course unit	**Research Skills**		
Code	WBIA/S2CE/ICM/D/18		
Field of specialisation	International Construction Management		
Administering faculty	Katedra Geotechniki		
ECTS	1,0	*ECTS (forms)*	1,0
Form of course credit	credits	*Language*	english
Electives		*Elective group*	

Form of instruction	*Code*	*Semester*	*Hours*	*ECTS*	*Weight*	*Credit*
lecture	W	3	15	1,0	1,00	credits

Leading teacher	Pozlewicz Andrzej (Andrzej.Pozlewicz@zut.edu.pl)
Other teachers	Visiting Professor (Visiting@zut.edu.pl), Wróblewski Tomasz (Tomasz.Wroblewski@zut.edu.pl), Żarkiewicz Krzysztof (Krzysztof.Zarkiewicz@zut.edu.pl)

Prerequisites

W-1	1st cycle degree in civil engineering

Module/course unit objectives

C-1	to provide each student with an opportunity to carry out independent research on given topic relevant to civil engineering and studied specialization

Course content divided into various forms of instruction		*Number of hours*
T-W-1	Purpose and method in a scientific study; the logic of scientific research and the choice of method. Theory and method; design and the research process. The deductive process and the research method. Case studies and complex strategies as a method. Research method and reliability of research results in the context of applicability; result application as the final verification of the correctness of the test; test verification methods.	15

Student workload - forms of activity		*Number of hours*
A-W-1	Attendance on lectures	15
A-W-2	Self study on methods used in scientific work	6
A-W-3	Personal study on methods of data analysis and testing hypothesis	6
A-W-4	Consultancies and completion of the subject	3

Teaching methods / tools

M-1	lecture and discussion

Evaluation methods (F - progressive, P - final)

S-1	P	progress report

Designed learning outcomes	Reference to the learning outcomes designed for the fields of study	Reference to the learning outcomes defined for the particular areas of education	Reference to learning outcomes leading to the degree of "inżynier"	Course objectives	Course content	Teaching methods	Evaluation methods
Knowledge							
B-A_2A_ICM/D/15_W01 Student undestands standards of scientific research and methods	B-A_2A_W02 B-A_2A_W05 B-A_2A_W06 B-A_2A_W14 B-A_2A_W15	P7S_WG_TA21 P7S_WK_TA21	P7S_WG_IA21 P7S_WK_IA21	C-1	T-W-1	M-1	S-1
Skills							
B-A_2A_ICM/D/15_U01 Student understands and distinguishes the relationship between the method and the applicability and usefulness of research results, is able to plan the research process	B-A_2A_U01 B-A_2A_U03 B-A_2A_U04 B-A_2A_U09 B-A_2A_U11 B-A_2A_U12	P7S_UK P7S_UO P7S_UW_TA21 P7S_UW_TA24	P7S_UW_IA21	C-1	T-W-1	M-1	S-1
Other social / personal competences							

B-A_2A_ICM/D/15_K01 Student understands the social significance of scientific research and is aware of the need for their applicability	B-A_2A_K01 B-A_2A_K02 B-A_2A_K04 B-A_2A_K05 B-A_2A_K07	P7S_KK P7S_KO P7S_KR		C-1	T-W-1	M-1	S-1

Required reading

1. Gaugh, H. G.,, Scientific Method in Practice, Cambridge University Press, Cambridge, 2003

2. Douglas C. Montgomery, Design and Analysis of Experiments, John Wiley & Sons, Inc., 2013, 8th Edition

Supplementary reading

1. M. Raman, S. Sharma, Technical Communicatio. Principles and Practice, Oxford University Press, Oxford, 2015, 3rd Edition