

COURSE DESCRIPTION CARD			
The name of the course/module GENERAL ENGINEERING 1 - LECTURE			Code A_K_1.2_003
Main field of study ARCHITECTURE		Educational profile (general academic, practical) general academic	Year / term I/2
Specjalization -		Language of course: Polish	Course (core, elective) core
Hours: Lectu res: 30 Classes: Laboratory classes: Projects / seminars:			Number of points 2
Level of qualification : I	Form of studies (full-time studies/part-time studies) Full-time studies and part-time studies	Educational area(s) Technical Sciences	ECTS distribution (number and %) 2 100%
Course status in the studies' program (basic, directional, other) (general academic, from a different major) Directional -			
Lecturer responsible for course/lecturer: mgr inż. Katarzyna Starzecka e -mail: kstarzecka@gmail.com Faculty of Architecture Division of Public Architecture and Housing ul. Nieszawska 13A, 61-021 Poznań tel. 61 665 33 05		Lecturer responsible for course/lecturer: mgr inż. Katarzyna Starzecka e -mail: kstarzecka@gmail.com Faculty of Architecture Division of Public Architecture and Housing ul. Nieszawska 13A, 61-021 Poznań tel. 61 665 33 05	
Prerequisites defined in terms of knowledge, skills, social competences:			
1	Knowledge:	<ul style="list-style-type: none"> - student has knowledge of general engineering and materials technology, physics and mathematics, - student has basic knowledge of technical drawing and general engineering related to architectural facility, - student knows the basic methods, techniques, tools and materials used at doing the simple tasks of technical manual drawing. 	
2	Skills:	<ul style="list-style-type: none"> - student can acquire information from field specific literature, data bases and other properly selected sources in Polish and English, can integrate the acquired information, interpret the said information, as well as draw conclusions and come up with opinions - student has self-education skills, - student can use the techniques of manual drawing relevant to realization of technical drawing, 	
3	Social competences:	<ul style="list-style-type: none"> - student understands the need for lifelong learning; can inspire and organize process of learning other people, - student can think and act in analytic manner. 	
Objective of the course:			
<ul style="list-style-type: none"> - presentation of basic information about the course, - presentation of building components, work of building as a whole, - presentation of loadings occurring in the building, differentiation of loadings depending on appropriation of the facility, - provide the basic information about „invisible” building elements and influence of ground and water conditions on the whole of design process, - introduction to the issues of variety of ceilings and possibilities of forming them, - presentation of basic information about other horizontal elements and their intended use in buildings, - presentation of vertical partitions and vertical bearing elements of buildings and verticality of loading transfer, 			

<ul style="list-style-type: none"> - introduction to the issues of variety of timber roof constructions and possibilities of using them, not only in housing, - provide the information to allow on correct design of flat roofs, - presentation of insulation elements occurring in buildings and with requirements in this regard concerning not only damp-proof and water insulation but also acoustic insulation, - presentation of heat requirements of buildings and presentation of calculation method of basic quantities related to building physics, - introduction of basic information about communication elements in buildings, - presentation of technologies and finishing systems in building engineering, - provide information about prefabrication, including prefabrication "returning" to housing, 		
Learning outcomes		
Knowledge:		
W01	Student has knowledge of general engineering	AU1_W10
Skills:		
U01	Student can acquire information from publications, data bases and other Polish and English sources, can interpret the said information and draw conclusions as well as voice and justify opinions	AU1_U01
U02	Student can make calculations in the area of general engineering, can prepare specification of materials	AU1_U12
Social competences:		
K01	Student can work over a set task independently and can cooperate in a team, assuming a number of different roles therein; demonstrates responsibility in the work performance	AU1_K01
K02	Student is aware of the importance of the solutions proposed by an architect and liability arising thereunder	AU1_K08
The evaluation methods		
<p>The credit condition of the lectures:</p> <p>- The credit prerequisite is obtain positive grade of the final test consisting of 15 questions. To pass the course, student has to obtain minimum 8 points of 15 possible points. Test is at the last lecture in the semester.</p> <p>Summative assessment:</p> <p>- final grading scale: 2,0; 3,0; 3,5; 4,0; 4,5; 5,0.</p> <p>Positive grade for module depends on achieved by student all learning outcomes specified in the syllabus.</p>		
Course contents		
<p>Lecture no. 1 The introductory lecture. Presentation of classes curriculum, credit requirements, discussion about range issues of general engineering on the basis of projects and implementation of selected buildings. Basic determinants concerning the course (building construction, buildings, structures).</p> <p>Lecture no. 2 Elements and components of the building. Discussion about basic components of building (facades, load-bearing walls, curtain walls, lintels, main beams, pillars, ceilings, rafter framings), constructional layouts (longitudinal, transverse, mixed, one-way, two-way), types of constructions (with load-bearing walls, frame construction, cantilevered construction, suspended construction etc.), classification according to type in general engineering – basic modular spans for individual constructional elements – with particular emphasis the constructional dimensions and dimensions "in the light".</p> <p>Lecture no. 3 Loads in buildings. Discussion about basic norms concerning the loads – static loads, basic technological loads, erection (changing loads), wind load and snow load with particular emphasis changing loads depending on building function. Discussion about the basic concepts relevant to design, design phases, preliminary selection of the constructional layout, materials, selection of ceilings. Calculation example of preliminary ceilings selection.</p>		

Lecture no. 4**Foundation of buildings.**

Discussion of methods of foundation engineering – direct foundations and indirect foundations, discussion about types of buildings foundation (continuous footings, base of foundation, scaffolds, piles, panels, cavity wall) materials, production technology and general rules for each type of foundation, discussion of basic information relevant to ground and water research and hydrogeological conditions.

Lecture no. 5**Horizontal elements of buildings – part 1 - ceilings.**

Discussion of ceilings functions in the building. Division of ceilings due to materials used: reinforced concrete, reinforced concrete and steel, ceramic and steel, steel, timber. Division of ceilings due to the production technology: prefabricated, semi-prefabricated, beam-and-block, monolithic (including flat slab floor and reinforced concrete slab ceilings). Basic constructional systems of ceilings – single-span and multispans, unidirectional and bidirectional. Advantages and disadvantages of individual solutions. Discussion of conditions influencing on selection the particular solution and thickness of ceiling.

Lecture no. 6**Horizontal elements of buildings – part 2 – other horizontal elements.**

Discussion of other horizontal elements of buildings: lintels (monolithic and prefabricate), main beams (reinforced concrete and steel), balconies and terraces (construction, possibilities to use, constructional requirements), frames and frame systems, framework. Rules of preliminary of gabarits selection of each elements, presentation of untypical constructional components such as Vierendeel beam, “hanging” ceiling. Functions of particular elements in the building.

Lecture no. 7**Vertical elements of buildings.**

Discussion of the walls functions in buildings, walls (load-bearing walls, curtain walls, partition walls, fundamental walls), discussion of role in buildings, discussion of production technology of walls and materials of which walls are made. Criterion of selection the technology, material and gabarit (load capacity, loads system, conditions of use – acoustic and thermic insulation), pillars – types of pillars, due to material used, scheme, shape – timber pillars, brick pillars, reinforced concrete pillars, steel pillars. Mullions– basic requirements. Pilasters. Technology of walls erection (bricklaying on the mortars, glued, prefabricated, monolithic). Systems of stratified walls of light lining.

Lecture no. 8**Roofs – timber roof constructions.**

Discussion of timber construction of roofs – rafter, rafter and purlin, rafter and purlin with collar beamed, rafter and purlin with collar beam and crown posts roofs, mansard. Components of individual constructions with basic sizes. Conditions of use the individual types of rafter framings, materials used to roof constructions. Connection methods of timber constructions – carpenter’s connections, nailed joint, bolted joint, steel connectors. Types of coverings used in rafter framings. Constructional elements from glued timber.

Lecture no. 9**Flat roofs and roof coverings.**

Presentation of constructions the flat roofs and ventilated flat roofs– ventilated flat roofs with access and ventilated flat roofs with no access, materials used to design of flat roofs and coverings of flat roofs (minimal gradient). Steel constructions of roofs – latticed roof truss and plate girder. Flashings on the roofs.

Lecture no. 10**Insulations in buildings.**

The insulations: water, damp-proof, thermic and acoustic – types, design, adoption. Details of design and production of insulations with particular emphasis typical “dangerous” places in buildings.

Lecture no. 11**Typification in construction. Window and door carpentry; insulation of building**

Presentation of typification elements in construction, including dimensional typification. Presentation of basic advantages of typification with particular emphasis of time aspect of investment realization and its costs. Discussion of basic types of window and door carpentry – disadvantages and advantages of particular solutions.

Lecture no. 12**Communication elements in buildings.**

Stairs, ramps, hoisting cranes, escalator, entrances and driveways to buildings. Division of communication elements due to materials used. Types of communication elements, construction, constructional requirements of used the selected communication elements. Design – basic patterns (“comfortable stairs”), adoption of basic dimensions of communication elements.

Lecture no. 13**Finishing elements of buildings.**

Plasters and internal and external wall linings. Underfloor layers in floors on the ground. Floors – materials, adoption, production. Painting in buildings. Elements of „light building” – plasters and plasterboards linings – types, adoption. Elevational system – constructional conditions for using the facades systems.

Lecture no. 14

Prefabrication and connectors.

The lecture introducing to building design using prefabricated elements. Constructional systems of prefabricated buildings in housing – wall system with frame elements, in industrial building – frame system, in public buildings – mainly frame system. Issues of systems of connectors used in building construction – “warm bolt”, wall connectors, facades fastening systems etc. Advantages and disadvantages of prefabrication.

Lecture no. 15

Credit colloquium

Credit of semester

Basic bibliography:

1. praca zbiorowa, Poradnik majstra budowlanego, Arkady 1992.
2. Żeńczykowski W.. Budownictwo ogólne 2/1, Arkady , Warszawa
3. Żeńczykowski W.. Budownictwo ogólne 2/2, Arkady , Warszawa
4. Żeńczykowski W.. Budownictwo ogólne 3/1, Arkady , Warszawa
5. Żeńczykowski W.. Budownictwo ogólne 3/2, Arkady , Warszawa
6. PN-82 B-02001 Obciążenia Budowli- Obciążenia stałe
7. PN-82/B-02003 Podstawowe obciążenia technologiczne i montażowe)
8. PN-77/B-02011 Obciążenie wiatrem
9. PN-82/B-02004 Obciążenia pojazdami),
10. PN-EN 1991-1-3:2005 Eurocod 1 Oddziaływania na konstrukcje. Część 1-3 Oddziaływania ogólne. Obciążenie śniegiem.

Supplementary bibliography:

1. Seria wydawnicza: Słabe miejsca w budynkach tomy 1-6 Arkady
2. Markiewicz P., Budownictwo ogólne dla architektów, Archi-Plus, Warszawa

The student workload

Form of activity	Hours	ECTS
Overall expenditure	50	2
Classes requiring an individual contact with teacher	30	1
Practical classes	20	1

Balance the workload of the average student

Form of activity	Number of hours
participation in lectures	30 h
participation in classes/ laboratory classes (projects)	-
preparation for classes/ laboratory classes	-
preparation to colloquium	1 x 20 h = 20 h
participation in consultation related to realization of learning process	-
preparation to the exam	-
attendance at exam	-

Overall expenditure of student:

2 ECTS credits

20 h

As part of this specified student workload:

- activities that require direct participation of teachers:

30 h = **30 h**

1 ECTS credit