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Social competencies:	3. Abili	ty to design building s	tructures utilising passive method	s of providing energy - [U05, U1	7]		
	Socia	I competencies:					

- 1. Student can identify and solve problems related to variety of engineering solutions [K04]
- 2. Student can cooperate in a team and provide leadership to the group [K01]
- 3. Student is conscious of the need for sustained development of his personal abilities [K03, K06]
- 4. Student can think and act creatively [K03]
- 5. Student understands the need for sustainable building [K04, K07]

The final test checking command of knowledge taken from lectures.

Scale of marks	(given as a	percentage	points)
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91-100	very good (A)
81 - 90	good + (B)
71 - 80	good (C)
61 - 70	pass + (D)
51 - 60	pass (E)
below 50	fail (F)

Course description

- 1. Sustainable building
- 2. How to design an energy efficient building
- 3. Energy Calculation methodology,
- 4. LCC, life cycle of the building,
- 5. BEMS Building Management System (control and monitoring of energy consumption), Energy management in the building Intelligent systems,
- 6. Energy efficiency in buildings practical examples, Case study: Improving energy efficiency
- Project and laboratory:

- Energy-efficient building design based on BIM and analysis of ecological aspect and cost - LCC, Optimum solution for set boundary conditions in term of cost end energy- heating, insulation, heat recovery

Lecturer: dr inż. M.KUCZ, d inż. K.Ratajczak, mgr inż. R.Milwicz

Basic bibliography:

1. Brown GZ and DeKay M Sun, wind & light, architectural design strategies 2nd ed. John Wiley & Sons 2001

- 2. Givoni B Man, climate & architecture 2nd ed. Van Nostrand Reinhold 1981
- 3. Givoni B Climate considerations in building and urban design Van Nostrand Reinhold 1998
- 4. Goulding JR, Lewis O and Steemers TC Energy in architecture Comm. of the European Communities 1993
- 5. Olgyay V Design with climate Van Nostrand Reinhold 1992 (repr.)

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- 2. Lennart J. Lundqvist, Sweden and ecological governance. Manchester University Press, Manchester 2004
- 3. Costanza R., Building a Sustainable and Desirable Economy-in-Society-in-Nature, ANU E Press, Canberra 2012
- 4. Berardi U., Moving to Sustainable Buildings: Paths to Adopt Green Innovations in Developed Countries.Versita,London 2013

5. EN ISO 13790:2006, Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies

Result of average student's workload

Activity		Time (working hours)
1. Classes participation		45
2. Works preparation		30
3. Computer work		15
4. Works finishing		15
Student's wo	rkload	
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	50	2
Practical activities	45	2