

Course Unit Title	CESU 310 Energy Design of Buildings
Programme of study	BSc in Civil Engineering
Lecturer	Dr.-Ing. Paris A. Fokaides
Type of course unit	Compulsory (for Sustainable Construction Stream)
ECTS	5
Year of study:	3
Semester(s) offered	Spring Semester 2013, 2014, 2015, 2016, 2017, 2018, 2019
Course content	<ul style="list-style-type: none"> ▪ Basic principles of energy transfer from and to the building envelope ▪ Indoor thermal comfort, indoor comfort indicators ▪ Best practices in building's thermal insulation ▪ Overall heat transfer coefficient of building elements ▪ Building's heat losses ▪ Energy performance certification (EPCs) calculations and issuance
Course modules:	<p><u>Module 1: Energy transfer principles</u></p> <ul style="list-style-type: none"> ▪ Fundamentals of energy transfer mechanisms ▪ Parameters affecting energy transfer mechanisms from and to the building envelope ▪ Quantification of energy losses – worked examples <p><u>Module 2: Indoor thermal comfort</u></p> <ul style="list-style-type: none"> ▪ Energy interaction between building user and building envelope ▪ The Fanger model – worked examples ▪ Quantification of thermal comfort indexes (PMV, PPD) ▪ The psychrometric chart – worked examples <p><u>Module 3: Building elements thermal behaviour</u></p> <ul style="list-style-type: none"> ▪ Definition of the overall heat transfer coefficient of building elements ▪ Calculation of energy losses from building elements consisting of several layers ▪ Definition of thermal bridges and calculation of energy losses ▪ Best practices in selection and application of buildings thermal insulation ▪ Minimum legislative requirements in buildings thermal insulation <p><u>Module 4: Buildings energy performance certification</u></p> <ul style="list-style-type: none"> ▪ Fundamentals of calculation buildings heating and cooling loads ▪ Building services contribution to buildings energy consumption ▪ Definition of the operational and asset rating ▪ Energy classification rationale – the reference building ▪ Definition of buildings energy class – worked examples
Textbooks:	ASHRAE, F. (2013). Fundamentals Handbook. SI Edition. Wärmeatlas, VDI. (2006). Verein Deutscher Ingenieure. Springer Verlag, Berlin, Heidelberg, New York, (2), 4.
Instruction language	English
External reference	link