

PROGRAMME - ACADEMIC YEAR 2012-2013

	MÓDULO 1. ENERGY MANAGEMENT. PASSIVE MEASURES	
Day	CLASSES	PROFESSOR
Week 1		
Thursday 13/9/12	Presentation. (morning / 0'5h)	Ana Sánchez-Ostiz
	Module 1 Presentation. "Sustainability and Energy Management" (morning / 1'5h)	
	Opening Conference: Myths & Theories of Sustainable Architecture (morning /2h)	Simos Yannas Director MSED in AA School, Londres
	Introduction to Bioclimatic Architecture. (afternoon /4h)	
Friday/m 14/9/12	Bioclimatic Architecture. (m / 4h)	
	Sustainable Architecture Project Analysis. (a/ 4h)	
Week 2		
Monday (m) 17/9/12	Barcos and Enríquez Architecture Studio Buildings Exhibition (m / 1,30h)	Manuel Enríquez
	Pamplona buildings tour. (m/ 2,30h)	
Wednesday 19/9/12	Practice 1 M1. Projects Critique Session. (m / 3h)	Manuel Enríquez
Thursday 20/9/12	Climate. Climatic Parameters (m / 2h) - Solar radiation. Solar radiation power. Solar charts. - Temperature - Relative Humidity - Wind Rose. Influence in the building's design. - Rainfall	Javier Neila
	Climate. Climatic zones (m / 2h) - Climatic zones according to CTE (Spanish Building Technical Rules) and TMY (Typical Meteorological Year) - Climate Classification - Climate database	
	Comfort (t / 3h) - Thermal comfort - Thermal comfort climographs	
Friday 21/9/12	Physical principles I (m / 4h) - Heat transfer - Physical properties and characteristic parameters of materials, components and systems: - Heat transfer in Opaque Enclosures - Heat transfer in insulators - Heat transfer in semi-transparent enclosures	Iván Flores
	Physical principles I (t / 3h) - Infiltrations and air renewal - External thermal loads - Interior thermal loads - Non-traditional building solutions	
Week 3		
Monday 24/9/12	EMV buildings tour, Madrid	
Tuesday 25/9/12	Decathlon building site tour, Madrid	
Wednesday 26/9/12	Practice 2 M1. Local climatology study. Climograph (m / 3h)	Aurora Monge Silvia Domingo



Thursday 27/9/12	Winter passive energetic strategies I. Use of solar radiation (m / 4h):	Helena Granados
	<ul style="list-style-type: none"> - Capture. - Accumulation: - Distribution - Energy conservation - Use of solar radiation quantification - Mass accumulators' thermal inertia quantification: - Conductive gap quantification - Natural convection quantification 	
Friday 28/9/12	Winter passive energetic strategies II (t / 3h)	Helena Granados
	<ul style="list-style-type: none"> -Thermal loss control <ul style="list-style-type: none"> - Opaque enclosures - Translucent and glass enclosures -Winter thermal balance -Exercise 1. Accumulation capacity of materials according to thickness. -Exercise 2. Thermal constant. Useful thermal mass. 	
Friday 28/9/12	Summer passive energetic strategies I. (m / 4h)	Helena Granados
	<ul style="list-style-type: none"> - Architectonic design for summer strategy. - Forms of heat dissipation: - Solar protection in opaque enclosures - Translucent and glass enclosures' solar protection 	
Friday 28/9/12	Summer passive energetic strategies II. (t / 3h)	Helena Granados
	<ul style="list-style-type: none"> - Natural ventilation - Thermal balance in summer -Exercise 1. Temperature variation in flooded roofs - Exercise 2. Temperature variation in cold surfaces. - Exercise 3. Buried pipes. Canadian wells. 	
Week 4		
Monday 1/10/12	Practice 3 M1. Physical Principles exercises (m / 3h)	Aurora Monge Silvia Domingo
Wednesday 3/10/12	Practice 4 M1. Building practice. Building draft. (m / 3h)	Manuel Enríquez
Thursday 4/10/12	Energetic refurbishment (m / 2h)	Ana Sánchez-Ostiz Silvia Domingo
	Energetic refurbishment. Case study (m / 2h)	Ana Morón Hernández
	Physical principles II (t / 4h):	Iván Flores
Friday 5/10/12	Urban Design (m / 4h)	Nico Largo Oregon University. USA
	Energetic refurbishment. Example: Zaragoza (t / 3h)	Juan Rubio



Week 5		
Wednesday 10/10/12	Practice 5 M1. Critic review session. Passive strategies justification. (m / 3h)	Manuel Enríquez
Thursday 11/10/12	Natural lighting I (m / 4h)	Helena Coch
	Natural lighting II (t / 3h)	
Week 6		
Monday 15/10/12	MODULE 1 PRACTICAL EXPOSITION (0,5h/GRUPO). HAND IN MODULE 1 PRACTICE (PM1). (m / 3h)	Ana Sánchez-Ostiz Manuel Enríquez Aurora Monge Silvia Domingo

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MÓDULO 2. ENERGY MANAGEMENT. ACTIVE MEASURES		
DAY	CLASSES	PROFESSOR
Week 1		
Tuesday 16/10/12	Module 2 Presentation (m / 0,5 hours)	German Ramos Carlos Fernández Banderas
	Design Builder (m / 3,5 hours) - Use of Design Builder - Loading Building data - Space modelling - Climate election	German Campos
	Design Builder (t / 3 hours) - Load analysis - Energetic demand analysis - Programme possibilities	
Wednesday 17/10/12	Physical principles applied to installations (m / 4 hours) - Light and colour. Characteristics of light. Colour systems - Thermal properties of matter. Equation of state. Gas behaviour.	Ivan Flores
	Physical principles applied to installations(t / 3 hours) - Fluid dynamics. Fluid flow. Turbulence. Viscosity	
Thursday 18/10/12	Examples of active measures in buildings. (m / 1,5 hours)	Karsten Jurkait
	Conference (m / 2 hours) Importance of active measures in buildings.	
	Conclusion: Active measures in buildings (t / 3 hours)	
Friday 19/10/12	The new 21st century energetic paradigm (m / 4 hours)	Ramón López
	The new 21st century energetic paradigm (t / 3 hours)	
Week 2		
Tuesday 23/10/12	Design Builder. (m / 4 hours) - Installations introduction - Programme results	German Campos
	Design Builder. (t / 3 hours) - Hand in and correction of a report dealing with the loads and energetic demands of the building under study. Practice 1 M2	
Wednesday 24/10/12	Guided visit. (m / 4 hours) - Valle de la Ultzama biomass plant - Biogas plant	Patxi Tornaría
Thursday 25/10/12	Biomass: local renewable energy. (m / 2 hours)	Fermín Olabe
	Conference Forest biomass in buildings, a reality. (m / 2 hours)	
	Actual situation of renewable energies. (t / 3 hours)	Ignacio Martí
Friday 26/10/12	Climate control systems. (m / 4 hours) - Definition. - Interior conditions. - Climate control systems classification. - Heat production.	Ricardo García San José
	Climate control systems (t / 3 hours) - Compression cycle. - Absorption cycle.	

Week 3		
Monday 29/10/12	Practice. (m / 4 hours) - Analysing one of the University's buildings. - Analysis of available energy sources - Profitability of adopted solution	José María Moro
Wednesday 31/10/12	Practice. (m / 4 hours) - Analysing one of the university's buildings. - Hand in and correction of a report on renewable energy on Decathlon's building site. Practice 2 M2	José María Moro
Friday 2/11/12	Climate control systems. (m / 4 hours) - Thermal distribution. - Emitters.	Ricardo García San José
	Climate control systems (t / 3 hours) - Adapting the system to the building.	
Week 4		
Monday 5/11/12	Practice.(m / 4 hours) - Analysing one of the University's buildings. - Climate control systems: Cold, Heat, Mixed and Cogeneration	José María Moro
Wednesday 7/11/12	Practice. .(m / 4 hours) - Analysing one of the university's buildings. - Hand in and correction of a report on the chosen climate control system and its advantages on the Decathlon's building site. Practice 3 M2	José María Moro
Thursday 8/11/12	Climate control systems. (m / 4 hours) - Renewable energy. - Thermal energy. - Heat pumps.	Ricardo García San José
	Climate control systems. (t / 3 hours) - Electricity production. - Cogeneration. - Integration of renewable energies in the building.	
Friday 9/11/12	Climate control systems. (m / 4 hours) - Near-zero energy buildings. - Energy audit of buildings	Ricardo García San José
	Climate control systems. (t / 3 hours) - Regulations	
Week 5		
Monday 12/11/12	Practice. (m / 4 hours) - Analysing one of the university's buildings. - Solar energy and regulation	José María Moro
Wednesday 14/11/12	Practice. (m / 4 hours) - Analysing one of the University's buildings. - Hand in and correction of a report on solar energy use and regulation on Decathlon's building site. Practice 4 M2	José María Moro
Thursday 15/11/12	Lighting, regulation, control and energy consumption in the installations. (m / 2 hours)	Miguel Ángel Abellanal
	Lighting, regulation, control and energy consumption in the installations. (m / 2 hours))	John Urtubi
	Lighting, regulation, control and energy consumption in the installations. (t / 3 hours)	Ignacio Muñoz
Friday 16/11/12	IDOM building introduction. (m / 2 hours)	Antonio Villanueva Peñalver



	Conference Towards zero energy consumption buildings. (m / 2 hours)	
	Data and conclusion on zero energy consumption buildings (t / 3 hours)	
Week 6		
Monday 19/11/12	Guided visit to the University's Master's Building (m / 4 hours)	German Ramos Carlos Fernández Banderas
Wednesday 21/11/12	Guided visit to CIMA installations (m / 4 hours)	German Ramos Carlos Fernández Banderas
	PAPER PRESENTATION (t / 4 hours) HAND IN MODULE 2 PRACTICAL WORK	German Ramos Carlos Fernández Banderas

PROGRAMME – ACADEMIC YEAR 2012-2013

MÓDULO 3. BUILDING ENVIRONMENTAL CERTIFICATION		
DAY	CLASSES	PROFESSOR
Week 1		
Thursday 22/11/12	Module 3 Presentation. (m /2h) “Strategies and aims of Building Environmental Certification”	Ana Sánchez-Ostiz
	Conference: “An energy outlook into building in Europe on the 2020 and 2050 horizon” (m/2h)	José María Campos Domínguez
	Energy Certification. Spanish official regulations on energy saving and energy efficiency, Lider, Calener	Eduarne Zubiri
Friday/m 23/11/12	Presentation of various tools for energy simulation. Accuracy of simulations. (m /1h) Design Builder (m /3h, t /3h) - Theory and Practice	Germán Campos
Week 2		
Monday 26/11/12	Practice. Lider (t /3h) - Justification of official regulations CTE-HE-1 “Energy Saving”, through the general option (Lider programme), in the Master’s Practices building.	Eduarne Zubiri
Tuesday 27/11/12	Practice. Calener (t /3h) - Justification of official regulations RD 47/2007, 19 January, that approve the basic procedure for energy certification of new buildings, through the general option (Calener programme), in the Master’s Practices building.	Eduarne Zubiri
Wednesday 28/11/12	Sustainability. Environmental Certification Methods (m /4h) - Sustainability certifications in buildings - Breeam and Breeam.es - Leed Certification - GBC Model. Green Tool - Other systems	Ana Belén de Isla
	Renaissance Project (t /3h) Monitoring Experiences in Zaragoza	José Antonio Turégano
Friday 30/11/12	The Passivhaus Standard (m /4h, t /3h) - 1. Definition of basic criteria - 2. European context and history of the standard - 3. Examples - 4. Controlled Ventilation - 5. PHPP Programme	Micheel Wassouf
Week 3		
Tuesday 4/12/12	Fan pressurization method (Blowerdoor). Basic concepts (m /2h)	Jorge Blazquez
	Practice: Monitoring of a dwelling (m ó t /2h)	Aurora Monge Silvia Domingo
	Practice: Fan pressurization method (Blowerdoor) (m ó t /2h)	Jorge Blazquez
Week 4		
Monday 10/12/12	Design Builder. (m / 4h) - Theory and Practice	Germán Campos
Tuesday 11/12/12	Practice: Monitoring of a dwelling: data collection (m /3h)	Aurora Monge Silvia Domingo

	Practice: Fan pressurization method (Blowerdoor) (t /3h)	(optativas del alumno)
Wednesday 12/12/12	Practice: Study of Environmental Certification on the Master's Practice building (m / 4h)	Aurora Monge Silvia Domingo
Thursday 13/12/12	Thermography Applied to Building 1 (m y t /7h) <ul style="list-style-type: none"> - Introduction to infrared thermography - Fundamental parameters: emissivity and reflected apparent temperature. Practical determination. - Use of thermographic camera on buildings and building materials. - Initial practice with thermographic camera. Manual settings, determination of emissivity and reflected apparent temperature on different building materials. - Use of thermographic image treatment software. Report writing 	Rafael Royo
Friday 14/12/12	Thermography Applied to Building 2 (m y t /7h) <ul style="list-style-type: none"> - Thermographic camera applied to building: envelope study, thermal bridge study and filtrations and air leaks analysis. - Case studies and examples of inspections performed. - Thermal box with insulating heterogeneity. - Real inspection on campus buildings. - Writing of report and given conclusions. 	Rafael Royo
Week 5		
Monday 17/12/12	Design Builder (m / 4h) <ul style="list-style-type: none"> - Theory and Practice 	Germán Campos
	Energy Certification in Refurbishment: Calener and CE3X (a /2h)	Eduarne Zubiri
Wednesday 19/12/12	Economic justification of the measures adopted in the projects (a /3h)	Pablo Cámara
Friday 21/12/12	MODULE 3 PRACTICE PRESENTATION(0,5h per GROUP). HAND IN MODULE 3 PRACTICE (PM3). (m / 3h)	Ana Sánchez-Ostiz Aurora Monge Silvia Domingo

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MÓDULO 4. OTHER ENVIRONMENTAL ASPECTS. NOISE MANAGEMENT		
DAY	CLASSES	PROFESSOR
Week 1		
Tuesday 8/01/13	Module 4 Presentation (m / 1 hours)	Purificación González Joaquín Torres
	Fundamentals of acoustics I (m / 3 hours) - Fundamentals of Acoustics - Time and Spectrum Analysis - Measurement indexes. ISO 1996	Miguel Arana
	Fundamentals of acoustics I (a / 3 hours) - Experimental devices - Forecast models and programmes	
Wednesday 9/01/13	Fundamentals of acoustics II (m / 4 hours) - Soundproofing. DB-HR - Acoustic conditioning	Miguel Arana
	Urban Acoustics (a / 3 hours) - Environmental Acoustics - Legislation (ED, Ley 37/2003, RD 1367/2007, DF 135/1989) - Noise Maps and Plans of Action - Environmental impact studies	
Thursday 10/01/13	Architectural Acoustics. Acoustic room conditioning. (m / 4 hours) Architectural Acoustics. Acoustic room conditioning (a / 3 hours)	
Friday 11/01/13	Building strategies and Project strategies (m / 4 hours) Building site visit (a / 3 hours)	Carmelo Fernández Militino
Week 2		
Monday 14/01/13	Measurements and acoustic tests. (m / 3 hours) - Lab tests - Acoustic lab visit	
	Fundamentals of acoustics exercises I. (a / 3 hours) - Acoustic conditioning - Insulation measures - Environmental noise - Installation noise - Hand in practice 1a M4	Miguel Arana
Tuesday 15/01/13	Acoustic measurements and tests. On site tests (m / 4 hours)	Carlos Eguizábal
	Fundamentals of acoustics exercises II (a / 3 hours) - Reverberation time - Absorption acoustics - Acoustic room conditioning - Hand in practice 1b M4	Miguel Arana
Thursday 17/01/13	Building noise regulations. (m / 2 hours) Noise management influx on architecture design (m / 2 hours) Applying DB-HR (I). (a / 3 hours)	Alejandro Sansegundo
Friday	Applying DB-HR (I). (m / 4 hours)	Alejandro



18/01/13	Applying DB-HR (I) (a / 3 hours)	Sansegundo
Week 3		
Monday 21/01/13	Applying DB-HR (II). (m / 3 hours)	Javier Ayucar
	Practice work on designed building. Applying DB-HR. Practice 2 module 4 (m / 1 hour)	
Tuesday 22/01/13	Practice work on designed building. Applying DB-HR. Practice 2 module 4 (m / 3 hours)	Javier Ayucar
Thursday 24/01/13	Practice work on designed building. Applying DB-HR. Practice 2 module 4 (m / 3 hours)	Javier Ayucar
Week 4		
Tuesday 29/01/13	Practice work on designed building. Applying DB-HR. Practice 2 module 4 (m / 3 hours)	Javier Ayucar
Wednesday 30/01/13	PAPER PRESENTATION (m / 4 hours) HAND IN M4 PRACTICAL WORK	Purificación González Joaquín Torres Javier Ayucar

PROGRAMME – ACADEMIC COURSE 2012-2013

MÓDULO 5. MATERIALS AND WASTE MANAGEMENT		
DIA	CLASSES	PROFESSOR
Week 1		
Thursday 31/01/13	Module 5 Presentation (m / 1 hour)	Purificación González Joaquín Torres
	Environmental impacts related to building. Environmental criteria for the election of materials I (m / 3 hours) <ul style="list-style-type: none"> - Identifying and evaluating significant environmental aspects. - traditional criteria for the election of materials and building products - The demand for sustainability and its relation to materials. Theoretical framework 	Albert Cuchí
	Environmental impacts related to building. Environmental criteria for the election of materials I (m / 3 hours) <ul style="list-style-type: none"> - Critique to our patterns of materials use in building - Alternatives and strategies for improvement 	
Friday 1/02/13	Timber source: the forest. Environmental aspects of timber (m / 2 hours) <ul style="list-style-type: none"> - Raw material. Origin. Sustainable and renewable source. Forest Management. - More relevant forest species in Europe / Navarre - Forest certification. Regulations on the subject: Europe/ Navarre - Characteristics of timber from an environmental and social perspective. Advantages of using timber. - Life cycle. Energy consumption. Comparison to other materials. 	Fermín Olabe
	Timber. Building aspects. (m / 2 hours) <ul style="list-style-type: none"> - Most relevant timber main characteristics - Timber's anatomical characteristics. - Timber as building material. Main characteristics. - Timber and durability - Timber and insulation. - Timber's behaviour in fire. - Timber in technical building codes 	Jose Manuel Cabrero
	Environmental criteria for the election of materials II (t / 3 hours). Eco labelling.	Purificación González Joaquín Torres
Week 2		
Monday 4/02/13	Practice 1 module 5 (PM5.1) (m / 4 hours) <ul style="list-style-type: none"> - Valuation of environmental impact: facade and roof design according to energy consumption and CO2 emissions. - ITeC data base management 	Purificación González Joaquín Torres
Tuesday 5/02/13	Practice 1 module 5 (PM5.1) (m / 4 hours) <ul style="list-style-type: none"> - Valuation of environmental impact: facade and roof design according to energy consumption and CO2 emissions - ITeC data base management 	Purificación González Joaquín Torres
Wednesday 6/02/13	Practice 1 module 5 (PM5.1) (m / 3 hours) <ul style="list-style-type: none"> - Hand in. 	Purificación González

	<ul style="list-style-type: none"> - Critique session. 	Joaquín Torres
Thursday 7/02/13	<p>Life Cycle Assessment (LCA) for the election of materials and products. Theoretical framework (I) (m / 4 hours)</p> <ul style="list-style-type: none"> - Definition and Objectives - Functional unit. Definition and examples. - LCA inventory: frequent use resources. Data bases 	Susana Sainz
	<p>Life Cycle Assessment (LCA) for the election of materials and products. Theoretical framework (II) (a / 3 hours)</p> <ul style="list-style-type: none"> - Environmental impact indicators - Environmental impact 	
Friday 8/02/13	<p>LCA Case studies applied to building. (m / 4 hours)</p> <ul style="list-style-type: none"> - Definition of objectives. Functional unit. - Definition of limits according to objectives. - Input data for analysis. Definition and Selection - Data filtering according to objectives. - LCA inventory selection and indicators according to objectives. - Analysis development. - Data output. - Output data filtering according to objectives. - Outcome interpretation. - Communication of outcome and uncertainties. - Links to other LCA methodologies, such as cost analysis. 	Susana Sainz
	<p>Tools for materials and building products' LCA. SIMAPRO programme (a / 3 hours)</p>	
Week 3		
Monday 11/02/13	<p>Practice 2 module 5 (PM5.2) (m / 3 hours)</p> <ul style="list-style-type: none"> - Applying LCA to a building's environmental design. - Use of SimaPro tool. 	Purificación González Joaquín Torres
Tuesday 12/02/13	<p>Practice 2 module 5 (PM5.2) (m / 3 hours)</p> <ul style="list-style-type: none"> - Applying LCA to a building's environmental design. - Use of SimaPro tool. - 	Purificación González Joaquín Torres
Wednesday 13/02/13	<p>Practice 2 module 5 (PM5.2) (m / 4 hours)</p> <ul style="list-style-type: none"> - Hand in. - Critique session 	Susana Sainz
Thursday 14/02/13	<p>Waste management. Theoretical framework and regulation that applies. (m / 4 hours)</p> <ul style="list-style-type: none"> - Construction and Demolition (C&D) Waste. Introduction. Issues. Management and definition of basic scenarios in their cycles. - Characterization and classification according to different parameters: origin, nature, later treatment. - Institutional management policies and normative framework. - Parties involved in the process 	Helena Granados
	<p>Types of building waste (a / 3 hours)</p> <ul style="list-style-type: none"> - Non-hazardous waste. Large fractions. Management strategies. - Hazardous and Toxic waste - Management strategies and actuation protocols. 	
Friday 15/02/13	<p>C&D Management. Possibilities for intervention on Project and site (m / 4 hours)</p> <ul style="list-style-type: none"> - Scenarios and types of work: building, demolition, restoration or refurbishment. - Project actions: prevention, minimisation and management 	Helena Granados



	<p>planning.</p> <ul style="list-style-type: none"> - C&D Waste treatment on site: separation, compaction, grinding and sieving.... - Functional requirements for internal management at the site and implementation stages associated to the different types of sites and destinations of C&D Waste. 	
	<p>C&D Waste Management and technical documents (a / 3 hours)</p> <ul style="list-style-type: none"> - C&D Waste Management Study - C&D Waste Management Plan 	
Week 4		
Monday 18/02/13	<p>Gardelegui's (Vitoria) C&D Waste Treatment Plant visit (m / 4 hours)</p> <p>Practice 3 module 5 (PM5.2) (a / 3 hours)</p> <p>Practical work: C&D Waste Management</p>	Purificación González Joaquín Torres
Tuesday 19/01213	<p>Practice 3 module 5 (PM5.2) (m / 3 hours)</p> <p>Practical work: C&D Waste Management</p>	Purificación González Joaquín Torres
Wednesday 20/02/13	<p>PAPER PRESENTATION (m / 4 hours)</p> <p>HAND IN MODULE 5 PRACTICAL WORK</p>	Purificación González Joaquín Torres

PROGRAMME - ACADEMIC YEAR 2012-2013

	INTERNATIONAL SEMINARS	
Day	CLASSES	PROFESSOR
Week 1		
Wednesday 27/2/13	<p>Design of Carbon Neutral Buildings, through Mahadev Raman 's Energy Tool 1.</p> <p>The course will broadly cover issues of sustainability in buildings but with a specific focus on achieving carbon neutral operation. Each day will be split into two parts, a seminar where topics are presented and discussed and a design workshop where students work in groups of three to develop the design of a carbon neutral building.</p> <p>The seminar topics will include a historical context for sustainable design, global environmental issues, climatic influences in design, human factors promoting comfort and wellbeing, passive design strategies, building facades, introduction to building systems, concepts of carbon neutrality and low energy design.</p> <p>During the design workshops, students will be introduced to a spreadsheet based Energy Tool that can be used for the rapid evaluation of energy consumption and carbon emissions in buildings. By the end of the three days, each student project will be developed to a level where the overall building design is clearly laid out, the key material and system selections have been made and the performance of the design has been evaluated to demonstrate carbon neutral operation.</p>	Mahadev Raman Princeton University USA
Thursday 28/2/13	Design of Carbon Neutral Buildings, through Mahadev Raman 's Energy Tool 2.	Mahadev Raman Princeton University USA
Friday 1/3/13	Design of Carbon Neutral Buildings, through Mahadev Raman 's Energy Tool 3.	Mahadev Raman Princeton University USA
Week 2		
Thursday 7/3/13	<p>Sustainable Architecture. A spatial challenge on all scales 1</p> <p>The seminar focuses on the combination between climate responsive design with material responsive design with research and investigations on both, in a holistic approach.</p> <p>Passive houses and Zero Energy Houses will be presented, explained and showed in detail including calculations (in cold and in warm climates) in context to how they are built (including embodied energy) and even more in context to social and economic sustainability. For the professor, it is no solution to develop building strategies which cannot be afforded in</p>	Walter Unterrainer Professor Umea + Aarhus School of Architecture. Sweden



	mainstream building processes.	
Friday 8/3/13	Sustainable Architecture. A spatial challenge on all scales 2	Walter Unterrainer Professor Umea + Aarhus School of Architecture. Sweden
Week 3		
Thursday 14/3/13	- Delineate the LEED process and understand how to properly apply it to inform design decisions - Understand the impacts of architecture on building energy performance	John Hannum New York University USA
Friday 15/3/13	- Identify appropriate integration strategies to reduce energy consumption in new construction and existing buildings in an effort to achieve Net Zero - Review of quantitative tools and techniques to estimate energy usage in buildings	John Hannum New York University USA
Week 4		
Thursday 21/3/13	Sustainable Strategies in the Architecture of Georg Reinberg Architect Reinberg will give a comprehensive overview about technical strategies to make buildings more sustainable. Those strategies will be brought into direct relation to its architectural meanings. The interrelationship between the effectivity of architectural and technical solutions will be explained and an outlook of what green building solutions will mean for the future of Architecture will be given. Special focus will be given to the "Passivhouse standard" and the so called "Active House".	Georg Reinberg Reinberg Architect. Wien, Austria
Friday 22/3/13	Projects in detail. Georg Reinberg Projects designed by Architect Reinberg will be discussed in detail (housing, renovation, offices, public buildings, buildings for tourism).	Georg Reinberg Reinberg Architect. Wien, Austria