

Integrating education with consumer behaviour relevant to energy efficiency and climate change at the universities of Russia, Sri Lanka and Bangladesh (BECK)

MODULE SPECIFICATION

Originating Institution, Department	Module Co-ordinator(s)
University of Bologna, Department of Architecture	Prof. Marco Pretelli

TITLE OF THE MODULE

Title of the module	Module code ¹
Climate Change Risk Assessment for the Heritage Buildings	

PROGRAMME(S) IN WHICH TO BE OFFERED:

Architecture and Design Cultures

LEVEL OF STUDIES²

First cycle (BSc/BA)	Second cycle (MSc/MA)	Third cycle (PhD) 🔀
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CREDITS AND LEARNING HOURS

Credit Value ³	ECTS Value ⁴	Indicative academic learning hours ⁵	Length (in Semesters) ⁶	Year in which to be offered
9	9	225	1	2

³ Permissible credit values as set out in Institution's Academic Regulations.



¹ To be indicated by the Institution.

² According to the Framework of Qualifications for the European Higher Education Area, Annex 8: <u>http://www.aic.lv/ace/ace_disk/Bologna/Bergen_conf/Reports/EQFreport.pdf</u>

⁴ European Credit Transfer System, 1 ECTS = 25-30 academic learning hours. Please refer to

ECTS Users' Guide: https://ec.europa.eu/education/ects/users-guide/docs/ects-users-guide_en.pdf

⁵ 1 academic learning hour is equal to 45 minutes.

⁶ Indicate 0.5, 1, 1.5 or 2.



ANNOTATION OF THE MODULE⁷

The course introduces aspects of consumer behaviour relevant to energy efficiency and climate change in the field of heritage buildings. Lessons are based on theoretical-operational contents and examples of good practice.

Climate change risk assessment for the heritage buildings highlights a complex scenario to which contemporaneity is called upon to answer. Heritage buildings themselves can give their contribution, by actively participating in this fundamental challenge. The module focuses on this topic and presents measures which are able to combine the improvement of energy efficiency and the preservation of heritage buildings.

AIM OF THE MODULE⁸

To introduce theoretical-operational issues to students and provide skills on the theme of consumer behaviour relevant to energy efficiency and climate change in the field of heritage buildings. The intent is to optimise the building capabilities processes through the development of specific tools aiming at both the acquisition of technical skills and the development of entrepreneurship suitable to exploit them.

MOOC LEARNING AND TEACHING STRATEGIES

The MOOC module contributes to the transfer of knowledge on the issues of the compatibility between the protection of heritage buildings and the environmental performance improvement of the activities that are necessary for their preservation. Furthermore, it contributes to the promotion of entrepreneurial skills that allow the acquired competencies to be used in local contexts. The common features of the course are:

- innovative teaching methods: the learning process organisation is based on MOOCs and learning by doing (practice management);
- heritage management: the course deals with the theme of heritage management in terms of preservation, energy efficiency and entrepreneurial skills;
- action on human resources: the approach aims at the training of different profiles skills, including the development of entrepreneurship centred on offering the developed skills, within the local market.

The BECK MOOC module is part of an Italian ongoing initiative in MOOCs: UNIBO Open Knowledge (UNI-BOOK), which is a platform for delivering Massive Open Online Courses developed by the University of Bologna. The three major orientations of the system are:

- 1) to shape the future of education;
- 2) to support the development of student's soft skills;
- 3) to impact on society through learning.

In order to shape the future of education, UNI-BOOK aims at using digital technology to improve teaching processes and learning experiences offered to students and at becoming a vehicle for the transformation of learning in the digital era.



⁷ Please provide brief summary of the module, up to 200 words.

⁸ Aim of the module must correspond to the BECK Capacity Building Framework.



In order to support the development of student's soft skills, UNI-BOOK provides students with a set of knowledge and abilities related to soft skills, supporting the development of behavioural competences which can effectively complement hard skills.

In order to impact on society through learning, UNI-BOOK intends to reach a large number of learners, responding to the increasing need for knowledge and developing competences for the benefit of a worldwide audience.

Within this framework, the BECK MOOC module starts from the state of art on the topic of the compatibility between the preservation of heritage buildings and the improvement of the environmental profile of this activity. In this regard, lessons refer to regulations, guidelines and scientific researches published in books, essays and articles.

In order to move from the theoretical field to the operational practice, the module then presents some best practices related to the combination of the improvement of energy efficiency and the preservation of heritage buildings. Especially, the case studies belong to different sub-markets and heritage assets (such as libraries, residential architectures, public buildings and urban areas, in order to address also the theme of the action on the boundary of heritage buildings).

Within this process of transfer of knowledge, the module deals with the themes of the Historic Indoor Microclimate (HIM), as well as with the issues related to the application of a life cycle perspective to evaluate the Life Cycle Assessment (LCA) and the Life Cycle Costing (LCC). This allows to make known both the environmental impacts of architectural practices and the benefits in terms of total cost, user comfort and building preservation.

Finally, the construction of expertise concerns the development not only of the skills needed to achieve the improvement of the environmental profile of preservation activities, but also of the forms of entrepreneurship centred on the supply of the developed skills. In this regard, theory and examples aim at developing capabilities to effectively apply the acquired competencies in local contexts.

Learning Outcomes of the module ⁹	Methods of studies	Assessment methods of student achievements ¹⁰	Assessment criteria of student achievements by assessment levels
O1. Able to explain	Blended learning:	Problematic questions	Threshold achievement level
the concepts,	the integrated	Intelligent tests	Know the benefits related to
theories and	method includes	Regular tests	consumer behaviour
perspectives of	computer learning	Problematic tasks	relevant to energy efficiency
consumer	systems, access to e-	Projects	and climate change in the
behaviour relevant	sources (open-	Peer evaluation	field of heritage buildings
to energy efficiency	source materials),	🔀 Automated feedback	Typical achievement level

INTENDED LEARNING OUTCOMES AND ASSESSMENT

⁹ Learning outcomes are specified in three categories – as **knowledge, skills and competence**. This signals that qualifications – in different combinations – capture a broad scope of learning outcomes, including theoretical knowledge, practical and technical skills, and social competences where the ability to work with others will be crucial. Please refer to Cedefop (2017). Defining, writing and applying learning outcomes: a European handbook. Luxembourg: Publications Office of the European Union. <u>https://www.cedefop.europa.eu/files/4156_en.pdf.</u> Learning outcomes of the module must correspond to the BECK Capacity Building Framework.

¹⁰ Please select from the list. Additional assessment methods may be added.

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L			<u> </u>
and climate change	self-study in the	Final evaluation	Able to explain the benefits
in the field of	virtual environment	U Other	related to consumer
heritage buildings	(learning materials,		behaviour relevant to
	including audio-		energy efficiency and
	visual materials, text		climate change in the field
	materials,		of heritage buildings, as well
	documentation of		as the main issues from
	best practices.		regulations, guidelines and
	hibliographical		scientific research in this
	references and		field
	evercises with an		Excellent achievement level
	integrated feedback		Able to explain the benefits
	mochanism)		rolated to consumer
	mechanismy		
			benaviour relevant to
			energy efficiency and
			climate change in the field
			of heritage buildings, and
			the main issues from
			regulations, guidelines and
			scientific research in this
			field, with a deep knowledge
			of the themes related to the
			Historic Indoor Microclimate
			(HIM), the Life Cycle
			Assessment (LCA) and the
			Life Cycle Costing (LCC)
O2. Able to	Blended learning:	Problematic guestions	Threshold achievement level
research and make	integrated method		Able to research and make
decisions in	as above		decisions in technical
technical aspects		Regular tests Problematic tasks	aspects for the combination
for the			of the improvement of
ion the			interventions in energy
			afficiency and the needs at
Improvement of			efficiency and the respect
interventions in			for the tangible and
energy efficiency		U Other	intangible values of heritage
and the respect for			buildings at a basic level
the tangible and			Typical achievement level
intangible values of			Able to research and make
heritage buildings			decisions in technical
			aspects for the combination
			of the improvement of
			interventions in energy
			efficiency and the respect
			for the tangible and
			intangible values of heritage
			buildings, by identifying
			appropriate behavioural
			strategies
			Excellent achievement level

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			Able to research and make decisions in technical aspects for the combination of the improvement of energy efficiency and the respect for the tangible and intangible values of heritage buildings at an advanced level
O3. Able to manage the expectations and the the demands of the consumer through entrepreneurial skills capable of applying the acquired competencies in local contexts	Blended learning: integrated method as above	 Problematic questions Intelligent tests Regular tests Problematic tasks Projects Peer evaluation Automated feedback Final evaluation Other 	Threshold achievement level Have basic skills to manage consumer attitudes through entrepreneurial skills capable of applying the acquired competencies in local contexts Typical achievement level Have intermediate skills to manage the expectations and the demands of the consumer through entrepreneurial skills capable of applying the acquired competencies in local contexts
			<i>Excellent achievement level</i> Have advanced skills to manage the expectations and the demands of the consumer through entrepreneurial skills capable of applying the acquired competencies in local contexts

MODULE MARK CALCULATION¹¹

Assessment components (in chronological order of submission/examination date)				
Type of		Duration	Word count (if	Component pass
assessment ¹²	Weighting, %	(if exam)	essay or similar):	required ¹³
Assessment of the degree of	50%			Yes 🖂 No 🗌

¹¹ Please list all components, sum must be equal to 100%. Note that successful course completion should be recognised as indicating worthwhile educational achievement.



¹² Please indicate in chronological order of submission date each assessment component by type, e.g. examination, home work, coursework, project.

¹³ Indicate Yes to specify the assessment component(s) to be passed in order to pass the module.



participation of the students			
Online examination (tests)	50%		Yes 🔀 No 🗌
Total:	100%		

SYLLABUS OUTLINE

No.	Topic ¹⁴	Number of hours ¹⁵
-	0. Introduction	
1.	Introduction to the module	1
	1. Climate change, circular economy, energy efficiency and heritage	
	buildings: references, documents and approaches	
	1.1. The worldwide reference framework	
2.	Climate change, circular economy and heritage buildings	5
3.	Climate change: documents and guidelines	12
4.	Circular economy and sustainability: perspectives toward the future	10
5.	Heritage as a driver for sustainable development	10
	1.2. Preservation and energy efficiency	
6.	Improving energy efficiency and preserving heritage buildings	5
7.	Energy efficiency of heritage buildings	10
8.	Charts and guidelines for conservation	12
	2. From theory to practice	
	2.1. Knowing heritage buildings and their microclimate	
9.	Preservation and Historic Indoor Microclimate (HIM)	5
10.	Historic Indoor Microclimate (HIM)	10
	2.2. Scenarios of intervention	
11.	Possible scenarios of intervention: some case studies	5
12.	The preventive conservation	10
13.	Actions on opaque enclosures, window and door frames	10
14.	Technical installations	10
15.	Actions on the building surroundings	10
	3. Perspectives for future interventions	
	3.1. Energy behaviour and heritage buildings: considerations and	
	orientations	
16.	Energy behaviour and heritage buildings: some considerations	5
17.	Energy behaviour and heritage buildings: orientations for intervention	10
	4. The management of interventions of energy saving in cultural	
	heritage	
	4.1. Management: targets and programming	
18.	The role of management in cultural heritage	5

¹⁴ Please add as many topics as needed.
 ¹⁵ Includes self-learning, on-line conferences and consultations.





19.	Documents	12
20.	The risk assessment	5
21.	Documents	12
	4.2. Performance measuring	
22.	Efficiency, efficacy, adequacy	6
23.	The performance evaluation	6
24.	The perceived performance	5
	4.3. The role of small business in interventions of energy saving	
25.	SMEs intervention and short, medium and long time perspective	5
26.	Documents	12
27.	The market of ES and the role of platforms and influencers	5
28.	Documents	12
	Total:	225

LEARNING MATERIALS¹⁶

Core materials (up to 5 references):

- 1. Bianchi M. (2020) Practice Enterprise and MOOCs in higher education. Real and perceived performances. "Do machines dream of electric workers? Understanding the impact of digital technologies on organisations and innovation". Springer series: Lecture Notes in Information Systems and Organisation (LNISO).
- 2. Lidelow S., Orn T., Luciani A., Rizzo A. (2019). Energy-efficiency measures for heritage buildings: A literature review. Sustainable Cities and Society, 45, 231-242.
- 3. Pretelli M., Fabbri K. (eds.) (2018). Historic Indoor Microclimate of the Heritage Buildings: A Guideline for Professionals who care for Heritage Buildings. Cham: Springer.
- 4. Boeri A., Antonini E., Gaspari J., Longo D. (2015). Energy Design Strategies for Retrofitting: Methodology, Technologies and Applications. Southampton: WIT Press.
- 5. Cassar M. (2005). Climate Change and the Historic Environment. London: UCL Centre for Sustainable Heritage, University College London.

Supplementary materials (up to 10 references):

- 1. Bianchi M. (2019). The prevention of risk in cultural heritage through the citizens' education at virtuous behaviour. The use of MOOCs and distance learning. International Conference "Behind the Buffer Zones. Archaeology at risk and illicit traffic of antiquities", University G. d'Annunzio of Chieti-Pescara, 15-17 May 2019. Oxford: Archaeopress Publishing.
- 2. Göttler M., Ripp M. (2017). Community Involvment in Heritage Management Guidebook. Regensburg: OWHC Regional Secretariat Northwest Europe and North America.
- 3. De Bouw M., Dubois S., Dekeyser L., Vanhellemont Y. (2016). EECHB-2016: Energy Efficiency and Comfort of Historic Buildings. Proceedings of the Second International Conference (Brussels, 19-21 October 2016). Brussels: Belgian Building Research Institute.



¹⁶ Courses should provide high quality materials to enable an independent learner to progress through selfstudy. Materials should make best use of online affordances (interactivity, communication, collaboration) as well as rich media (video and audio) to engage students with their learning.



- 4. Del Curto D., Luciani A. (2016). From Heritage to Environment: Sustainability and Resilience in Building Conservation. Eresia ed ortodossia nel restauro: Progetti e realizzazioni, edited by Biscontin G., Driussi G. Marghera-Venezia: Arcadia Ricerche, 127-137.
- 5. Fabbri K., Pretelli M. (2016). New Concept of Historical Indoor Microclimate: Learning from the Past for a More Sustainable Future. Procedia Engeenering, 161, 2173-2178.
- Fabbri K., Pretelli M. (2015). Historic Microclimate vs Modern Standards. From Pre-plan Indoors Microclimate Performances to Modern Performances in Historic Buildings. Standardization, Prototypes and Quality: A Means of Balkan Countries' Collaboration. Proceedings of the 12th International Conference (Izmit, 22-24 October 2015). Kocaeli, 1, 51-58.
- López M., Yánez A., Gomes Da Costa S., Avellà L. (eds.) (2014). Proceedings of the International Conference on Energy Efficiency and Historic Buildings (Madrid, 29-30 September 2014). Madrid: Fundación de Casas Históricas y Singulares y Fundación Ars Civilis.
- 8. Fabbri K., Pretelli M., Ugolini A. (2013). "Historic Plants as Monuments": Preserving, Rethinking and Re-using Historic Plants. Journal of Cultural Heritage, 14, 3, S, 38-43.
- 9. Bianchi M. (2010). Toward a simplification of performance indexes and a balanced system of evaluation for public organizations facing the turmoil era. EURAM Conference "Back to the Future", Rome 19-22 May 2010. Track 15: Public organizations challenges: back to the theory.

10.(2006). Climate and Building Physics in the Modern Movement. Monographic number of Docomomo Preservation Technology Dossier, 9.

On-line resources (up to 5 references)¹⁷:

- ICOMOS CCHVG (2019). The Future of Our Pasts: Engaging Cultural Heritage in Climate Action. Outline of Climate Change and Cultural Heritage <u>https://adobeindd.com/view/publications/a9a551e3-3b23-4127-99fd-</u> <u>a7a80d91a29e/g18m/publication-web-resources/pdf/CCHWG final print.pdf</u>
- ICOMOS (2017). ICOMOS Action Plan: Cultural Heritage and Localizing the UN Sustainable Development Goals (SDGs) <u>https://www.icomos.org/images/DOCUMENTS/Secretariat/2017/ICOMOS Action Plan</u> <u>Cult Heritage and Localizing SDGs 20170721.pdf</u>
- 3. ICOMOS CIVVIH, ICOMOS-Korea (2017). *Urban Heritage and Sustainability* http://openarchive.icomos.org/1884/1/2016%20CIVVIH_pdf.pdf
- UNITED NATIONS (2015). Transforming our world: the 2030 Agenda for Sustainable Development <u>https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sus</u> tainable%20Development%20web.pdf
- 5. UNITED NATIONS (1992). United Nations Framework Convention on Climate Change https://unfccc.int/resource/docs/convkp/conveng.pdf

Other materials:

Lecture materials available at the platform UNI-BOOK.

REQUIRED IT RESOURCES¹⁸

¹⁷ Please provide links.



¹⁸ Please add as many software as needed for the course.



No.	Software, manufacturer
1.	Browser web (i.e. Safari, Google Chrome, Firefox)
2.	Adobe Acrobat Reader

Date of completion of this version of Module Specification:

Date of approval by the Faculty:

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