

OIKONET A global multidisciplinary network on housing research and learning



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| Work Programme Description | Common standards for the award and transfer of credits between institutions has proved to be a difficult topic in previous projects. Starting from standardised approach to the design of learning and alignment of learning outcomes with assessments, this deliverable will seek to obtain agreement on the award of credits (ECTS) for some example learning activities across several institutions. The TUNING project established a methodology for this process and this will be adapted as appropriate for use in this project. Although most of the discussions will be between a small number of volunteer partners, the output will be a description of the process developed and exemplar modules selected, of value to all partners and to those working in allied disciplines. | | | | |
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1 EXECUTIVE SUMMARY

This report presents the work done during the project to create a common base to evaluate the learning activities carried out in various settings (collaborative learning activities, workshops). The ultimate goal has been to create a list of competences to be used in the design of a curriculum focused on the theme “Global Dwelling”. This table can be instrumental in the design of future courses carried out by OIKONET partners, either in their own curricula or in joint courses with other partners.

The methodology used to elaborate the table of competences is a follow-up of the one previously applied in the OIKODOMOS Virtual Campus project. In that project, the aligned teaching and learning model proposed by Biggs and Tang was used to relate learning activities and competences in the learning design process. A similar approach has been adopted in the design of the collaborative learning activities and in the OIKONET MOOC (see Deliverable 4.2 “Massive Open Online Course”).

The topics for a learning program built around “Global Dwelling” were identified from the mapping of research activities carried out in WP2 Housing Research (see Deliverable 2.4 Deliverable 2.4 “Research matrix- Mapping of research within network”). A series of topics were identified from this map and then reformulated as teaching and learning subjects:

- Dwelling in a global and local context
- Dwelling practices
- Flexible housing design systems
- Environmental sustainability
- Social and cultural resources
- Policies and strategies
- Innovative construction technologies

For each of these themes, a series the learning outcomes and competences have been defined (see Appendix). These definitions have been aligned with the definition of similar competences proposed by other studies, such as the Subject Benchmark Statement for Architecture of the Quality Assurance Agency for Higher Education (QAA) in the UK, the survey created by the European Network of Heads of Schools of Architecture (ENHSA), and the ECTP Guidelines on Professional Competences in Spatial Planning.

One of the distinctive features of a learning programme built around the concept of “Global Dwelling” is the integration of research and community actions into the pedagogical activities. The future graduate will need to have the skills to carry out research to find out the specific features of a problem dealing with dwelling in a global scale and the ability to involve local community actors in the processes to define the problems at stake and to propose solutions for them. With this purpose, specific features of pedagogical models such as “project-based learning”, “research as design”, “designerly research”, and “action research” need to be interwoven into the design of learning activities in order to facilitate student acquisition of these competences.

2 INTRODUCTION

2.1 Purpose and target group

This report is aimed at learning designers –inside and outside the OIKONET consortium– committed to reforming existing curricula on housing studies in architecture and urban planning schools by developing more inclusive pedagogical programs that cut across established curricula. The table of learning outcomes and competences in the Appendix can be useful in the design of a new learning programs based on the alignment of competences, objectives and learning outcomes.

2.2 Contribution of partners

This report has been prepared by Leandro Madrazo (LA SALLE). Johan Verbeke created a first draft of the template to define the competences. Jim Roche (DIT), Nicolai Steinø (AAU), and Vaso Trova (UTH) contributed to complete and reorganize an early version of the table. Paul Riddy has provided advice on the learning outcomes specifications and the constructive alignment methodology, and has made a revision of the final version of the table of learning outcomes and competences.

2.3 Relations to other activities in the project

The evaluation procedures summarized in this report have been designed and implemented in other activities of the OIKONET project. The topics for a learning programme for “Global Dwelling” have been derived from the mapping of research topics on contemporary housing conducted in WP2 Housing Research (see Deliverable 2.4); some learning outcomes have been defined for the collaborative learning spaces implemented in WP4 Pedagogical Activities (see Deliverable 4.1) and for the MOOC (see Deliverable 4.2).

3 LEARNING OUTCOMES AND COMPETENCES

3.1 Bologna process

With the educational reform known as the “Bologna Process” which started in 1999, the European Union pursued several objectives: to ensure comparability in the standards and quality of higher-education qualifications, to strengthen quality assurance, and to modernise education and training systems to make sure these meet the needs of a changing labour market.¹

Learning outcomes and competences became fundamental components of the Bologna reform insofar they were expected to provide more transparency to the evaluation in higher-education systems. According to Adam, the value of learning outcomes lies in “the clarity and precision they bring to any curriculum development process”, although “their acknowledged importance stands in stark contrast to the poor level of understanding associated with them and their relatively rare practical implementation, at least in any explicit manner, across Europe” (Adam, 2006). Learning outcomes are fundamental to create a teaching and learning student-centred pedagogic model: “They are the foundation stone of the new architecture of educational reform” (Adam, 2006). However, their implementation in curriculum design and development has been hindered by the lack of a common definition.

Competences is a term commonly associated to learning outcomes, and often confused with them. Defining competences has become as difficult as defining learning outcomes. The confusion between the two terms was already present in the ECTS Users’ Guide (2005) which defined learning outcomes as competences: “Learning outcomes are sets of competences, expressing what the student will know, understand or be able to do after completion of a process of learning, whether long or short” while it left open the possibility that competences would be something else than learning outcomes: “The actual competences acquired by the individual learner may of course go beyond the stated learning outcomes” and went on concluding that “Competences represent a dynamic combination of attributes, abilities and attitude”.

The later edition of the User’s Guide from 2009 attempted to clarify the meanings of the two terms, by defining competences as

“A dynamic combination of cognitive and metacognitive skills, knowledge and understanding, interpersonal, intellectual and practical skills, ethical values and attitudes. Fostering competences is the object of all educational programmes. Competences are developed in all course units and assessed at different stages of a programme. Some competences are subject-area related (specific to a field of study), others are generic (common to any degree course). It is normally the case that competence development proceeds in an integrated and cyclical manner throughout a programme.”

while learning outcomes would be

“Statements of what a learner is expected to know, understand and be able to do after successful completion of a process of learning.”

In the latest version of the ECTS User’s Guide (2015) the two terms are defined as follows:

“Competence means ‘the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. ... Competences can be generic or subject-specific. Fostering competences is the

¹ http://ec.europa.eu/education/policy/higher-education/bologna-process_en

object of a process of learning and of an educational programme.”

“Learning outcomes express the level of competence attained by the student and verified by assessment. They are ‘statements of what a learner knows, understands and is able to do on completion of a learning process’. They are formulated by academic staff, involving students and other stakeholders. In order to facilitate assessment, these statements need to be verifiable.”

3.2 Tuning educational structures in Europe

The project “Tuning educational structure in Europe” started in 2000 with the purpose of helping universities to find out “points of reference, convergence and common understanding” during the Bologna process². Some of the project recommendations have informed the successive editions of the ECTS Guides. In “A Tuning Guide to Formulating Degree Programme Profiles” a distinction between learning outcomes and competences is established in these terms (Lokhoff et al., 2010):

“A competence is a quality, ability, capacity or skill that is developed by and that belongs to the student.”

“A learning outcome is a measurable result of a learning experience which allows us to ascertain to which extent / level / standard a competence has been formed or enhanced. Learning outcomes are not properties unique to each student, but statements which allow higher education institutions to measure whether students have developed their competences to the required level.”

Furthermore, in the same document competences are defined as follows:

“Competences represent a dynamic combination of cognitive and metacognitive skills, demonstration of knowledge and understanding, interpersonal, intellectual and practical skills, and ethical values. Fostering these is the object of all educational programmes. Competences are developed in all course units and assessed at different stages of a programme. Some competences are subject-area related (specific to a field of studies), while others are generic (common to any degree programme). It is normally the case that competence development proceeds in an integrated and cyclical manner throughout the programme.”

The Tuning project also distinguished between generic and specific competences. Generic competences are those which are transferable between subject areas, such as research and management abilities, teamwork, creativity, and communication skills. Other competences are specific to a particular field of study.

² <http://www.unideusto.org/tuningeu/>

4 SPECIFIC COMPETENCES IN ARCHITECTURE AND URBAN PLANNING

In architecture and urban planning, several initiatives have been undertaken by different organizations and institutions to establish the specific competences for these fields.

4.1 EU Directive 2005/36/EC: architects' skills

According to the EU Directive 2005/36/EC, the training of an architect should guarantee the acquisition of the following knowledge and skills:

- (a) ability to create architectural designs that satisfy both aesthetic and technical requirements;
- (b) adequate knowledge of the history and theories of architecture and the related arts, technologies and human sciences;
- (c) knowledge of the fine arts as an influence on the quality of architectural design;
- (d) adequate knowledge of urban design, planning and the skills involved in the planning process;
- (e) understanding of the relationship between people and buildings, and between buildings and their environment, and of the need to relate buildings and the spaces between them to human needs and scale;
- (f) understanding of the profession of architecture and the role of the architect in society, in particular in preparing briefs that take account of social factors;
- (g) understanding of the methods of investigation and preparation of the brief for a design project;
- (h) understanding of the structural design, constructional and engineering problems associated with building design;
- (i) adequate knowledge of physical problems and technologies and of the function of buildings so as to provide them with internal conditions of comfort and protection against the climate;
- (j) the necessary design skills to meet building users' requirements within the constraints imposed by cost factors and building regulations; (k) adequate knowledge of the industries, organisations, regulations and procedures involved in translating design concepts into buildings and integrating plans into overall planning.

4.2 ENHSA survey

In the 9th meeting of the European Network of Heads of Schools of Architecture (ENHSA) in 2006, the outcomes of a survey conducted among schools of architecture to find out the competences and learning outcomes in architectural education were presented (ENHSA, 2006). As a result of this study, a set of generic and specific (in the profession, and for research) competences were identified for the undergraduate and postgraduate studies (Master, PhD).

| Bachelor | Masters | PhD |
|---|--|--|
| High level computing skills including the ability to use the Internet critically as a means of communication and a source of information.(15) | Capacity to develop an analytical and critical thinking and understanding.(7) | Capacity to develop an analytical and critical thinking and understanding.(7) |
| "Learning to learn" ability.(13) | Capacity to apply a spirit of synthesis of ideas and forms.(9) | Capacity to evaluate ideas, proposals, forms.(12) |
| Capacity to apply a spirit of synthesis of ideas and forms.(9) | Capacity to generate creatively new ideas and forms.(10) | Appreciation of the diversity and multicultural quality of contemporary European society.(3) |
| Personal and social skills in expression and communication by speaking, writing and sketching.(16) | Ability to develop a trans-disciplinary understanding.(2) | "Learning to learn" ability.(13) |
| Capacity to apply knowledge in practice.(8) | Personal and social skills in expression and communication by speaking, writing and sketching.(16) | Personal and social skills in expression and communication by speaking, writing and sketching.(16) |

Generic Competences. Source: ENHSA, 2006

| Bachelor | Masters | PhD |
|---|---|--|
| Understanding of the relationship between people and buildings and between buildings and their environments, and of the need to relate buildings and the spaces between them to human needs and scale.(9) | Understanding of the relationship between people and buildings and between buildings and their environments, and of the need to relate buildings and the spaces between them to human needs and scale.(9) | Ability to recognize and use appropriately architectural theories, concepts, paradigms and principles.(4) |
| Knowledge of contemporary and historical works that have achieved the highest standards in architecture.(6) | Adequate knowledge of the history and theories of architecture and related arts, technologies and human sciences.(2) | Adequate knowledge of the history and theories of architecture and related arts, technologies and human sciences.(2) |
| Adequate knowledge of the history and theories of architecture and related arts, technologies and human sciences.(2) | Ability to create architectural designs that satisfy both aesthetic and technical requirement.(1) | Ability to communicate appropriately to a variety of audiences in oral, written and graphic forms.(23) |
| Understanding of the structural design, construction and engineering problems associated with building design.(15) | Ability to communicate appropriately to a variety of audiences in oral, written and graphic forms.(23) | Ability to abstract and present key elements and relationships.(7) |
| Ability to create architectural designs that satisfy both aesthetic and technical requirement.(1) | Awareness of the issues and themes of present day architectural debate.(3) | Awareness of the issues and themes of present day architectural debate.(3) |

Professional Competences. Source: ENHSA, 2006

| Bachelor | Masters | PhD |
|---|--|--|
| Ability to use IT and Internet resources (statistical, cartographical methods, database creation, etc.).(13) | Ability to communicate appropriately in written, oral and graphic forms.(11) | Ability to reference sources accurately and appropriately.(17) |
| Ability to communicate appropriately in written, oral and graphic forms .(11) | Ability to evaluate evidence and draw appropriate conclusions.(18) | Ability to identify and use appropriately sources of relevant information and to identify and use relevant retrieval tools (bibliographical sources, archival inventories, etc.).(8) |
| Awareness of the highest standards of achievement in architecture, in design, in built work and in scholarship .(3) | Ability to identify and use appropriately sources of relevant information and to identify and use relevant retrieval tools (bibliographical sources, archival inventories, etc.).(8) | Ability to evaluate evidence and draw appropriate conclusions.(18) |
| Ability to evaluate evidence and draw appropriate conclusions .(18) | Ability to use IT and Internet resources (statistical, cartographical methods, database creation, etc.).(13) | Ability to define research topics which will contribute to knowledge and debate within architecture.(5) |
| Ability to write in one's own language, using correctly the various types of architectural literature .(16) | Ability to reference sources accurately and appropriately.(17) | Ability to communicate appropriately in written, oral and graphic forms.(11) |

Research Competences. Source: ENHSA, 2006

4.3 QAA Subject Benchmark Statement

The Quality Assurance Agency for Higher Education (QAA) is an independent organization that checks on standards and quality in UK higher education. It conducts quality assessment reviews, develops reference points and guidance for providers, and conducts or commissions research on relevant issues.³ QAA has published a Subject Benchmark Statement for Architecture (QAA, 2010) which contains the competences that architecture graduates should achieve at the end of the studies. A “Subject benchmark statement” provides “a means for the academic community to describe the nature and characteristics of programmes in a specific subject or subject area” and a “general guidance for articulating the learning outcomes associated with the programme” (QAA, 2010). The benchmark statement for architecture takes as reference the criteria established by the Architects’ Registration Board (ARB) and the Royal Institute of British Architects (RIBA).

The benchmark distinguishes between general criteria (GC) and the graduate attributes (GA) to be achieved at the end of the studies. Eleven general criteria have been identified:

- *GC1 Ability to create architectural designs that satisfy both aesthetic and technical requirements*
- *GC2 Adequate knowledge of the histories and theories of architecture and the related arts, technologies and human sciences*
- *GC3 Knowledge of the fine arts as an influence on the quality of architectural design*
- *GC4 Adequate knowledge of urban design, planning and the skills involved in the planning process*
- *GC5 Understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scale*
- *GC6 Understanding of the profession of architecture and the role of the architect in society, in particular in preparing briefs that take account of social factors*

³ <http://www.qaa.ac.uk/>

- *GC7 Understanding of the methods of investigation and preparation of the brief for a design project*
- *GC8 Understanding of the structural design, constructional and engineering problems associated with building design*
- *GC9 Adequate knowledge of physical problems and technologies and the function of buildings so as to provide them with internal conditions of comfort and protection against the climate*
- *GC10 The necessary design skills to meet building users' requirements within the constraints imposed by cost factors and building regulations*
- *GC11 Adequate knowledge of the industries, organisations, regulations and procedures involved in translating design concepts into buildings and integrating plans into overall planning*

The graduate attributes are organized in two groups:

- GA1 Part 1 will be awarded to students who have:

1. *ability to generate design proposals using understanding of a body of knowledge, some at the current boundaries of professional practice and the academic discipline of architecture*
2. *ability to apply a range of communication methods and media to present design proposals clearly and effectively*
3. *understanding of the alternative materials, processes and techniques that apply to architectural design and building construction*
4. *ability to evaluate evidence, arguments and assumptions in order to make and present sound judgments within a structured discourse relating to architectural culture, theory and design*
5. *knowledge of the context of the architect and the construction industry, and the professional qualities needed for decision making in complex and unpredictable circumstances*
6. *ability to identify individual learning needs and understand the personal responsibility required for further professional education.*

- GA2 Part 2 will be awarded to students who have:

1. *ability to generate complex design proposals, showing understanding of current architectural issues, originality in the application of subject knowledge and, where appropriate, to test new hypotheses and speculations*
2. *ability to evaluate and apply a comprehensive range of visual, oral and written media to test, analyse, critically appraise and explain design proposals*
3. *ability to evaluate materials, processes and techniques that apply to complex architectural designs and building construction, and to integrate these into practicable design proposals*
4. *critical understanding of how knowledge is advanced through research to produce clear, logically argued and original written work relating to architectural culture, theory and design*
5. *understanding of the context of the architect and the construction industry, including the architect's role in the processes of procurement and building production, and under legislation*

6. *problem solving skills, professional judgement, and ability to take the initiative and make appropriate decisions in complex and unpredictable circumstances*
7. *ability to identify individual learning needs and understand the personal responsibility required to prepare for qualification as an architect.*

4.4 European Council of Spatial Planners

The ECTP-CEU (European Council of Spatial Planners - Conseil Européen des Urbanistes) brings together 27 professional town planning associations and institutes from 25 European countries as well as corresponding members⁴. One of the tasks of the organization is to set the standards of education for the planning profession. With this purpose, the organization has elaborated the document “ECTP Guidelines on Professional Competences in Spatial Planning” (ECTP, 2017). Eight core competences have been identified and structured in three blocks:

1. Critical thinking and understanding of the basic rationale of planning and its theoretical and legal basis, including the desirability of legitimacy of and conditions for purposeful planning interventions:

- *Core Competence 1: The Rationale of Planning*

2. An understanding of the spatial systems which shape society and the environment based on an understanding of spatial relationships, for example, how economies and their infrastructures function; or how communities achieve cultural cohesion and social inclusion; or environmental capacity and ecological impact; or the quality, form and identity of places. These understandings are critical to the preparation and advancement of planning interventions and the assessment of their impacts

- *Core Competence 2: Socio-economic systems*
- *Core Competence 3: The Built Environment*
- *Core Competence 4: Environmental systems*

3. Technical and creative skills needed to engage in planning practice. These skills include survey, analysis, and independent research, and which are sensitive to the effects over time and to produce planning solutions and which achieve quality outcomes, through informal as well as regulatory processes.

- *Core Competence 5: Planning Techniques*
- *Core Competence 6: Planning Instruments*
- *Core Competence 7: Planning ‘Products’*
- *Core Competence 8: Independent Research*

⁴ <http://www.ectp-ceu.eu/>

5 APPLYING LEARNING OUTCOMES

During the learning activities carried out in the OIKONET project, learning outcomes have been defined in different contexts: in the collaborative learning spaces, in the MOOC, and in the workshops. In all of these cases, we have adhered to the constructive alignment methodology proposed by Biggs and Tang (2011). This methodology seeks alignment of the various elements that intervene in learning design: aims, resources, methods, assessment, and evaluation⁵. A key consideration underlying this methodology is that everything to be assessed is underpinned by a supporting learning process.

In an ideal situation, the first iteration in a learning design process would start with aims and learning outcomes followed by alignment of the other elements (Figure 1). In practice, a designer of learning might start at other points and align by cross-checking and subsequent iteration around the cycle. In this aligned model the assessment methods should be selected to be consistent with the learning outcomes, assignments being set to test the students understanding as indicated by the *active verbs* used within the learning outcomes.

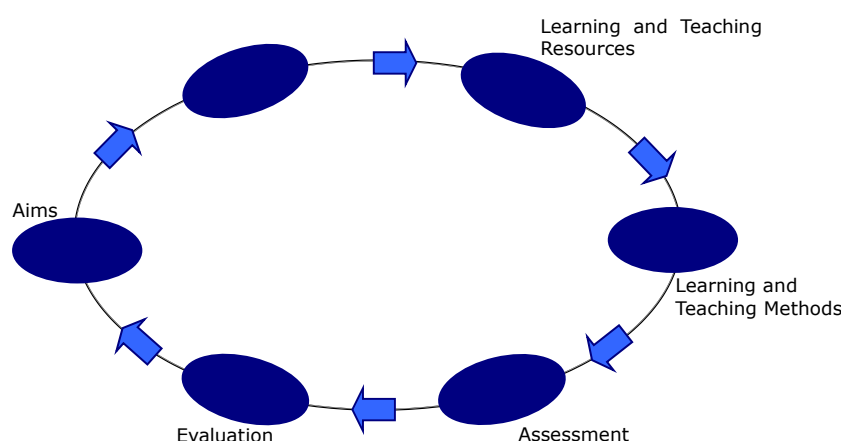


Figure 1. Schematic of the aligned learning and teaching model based on Biggs work (Biggs & Tang, 2011)

This constructive alignment was already applied in the design of the learning activities of the OIKODOMOS Virtual Campus (Madrado, 2011). It has also been a reference for the learning design template produced by OIKONET partners to facilitate the design of joint learning spaces (see Deliverable 4.1 “Learning Spaces”).

⁵ As stated in the ECTS User’s Guide (2015). “This constructive alignment between learning outcomes, learning activities and assessment is an essential requirement for educational programmes.”

- 1) Define what you want the students to learn (common learning goals)**
(e.g. The students should be able to critically analyse the connections between architecture and social context)
- 2) What can each partner / their institution contribute? (given the learning goals above)**
 - Institution_1
 - o specific expertise
 - o teaching and learning resources (e.g. online or other formats)
 - o assessment activities
 - o past experiences / courses
 - o what is your contribution / job in creating the Learning Space
- 3) Define the Learning Activities (how will the students achieve the goals defined above)**
 - LA1
 - o Title, Description, Keywords
 - o Learning Outcomes
 - o Tasks (TK1, TK2,...)
 - Titles, Description

The following are some examples of the learning outcomes defined according to the previous template (the alignment of learning design and outcomes can be seen in the completed templates included in Appendices of Deliverable 4.1 “Learning Spaces”). The learning outcomes were jointly described by teachers from different institutions participating in the learning space.

Learning space: “Introduction to Housing”

- The student will be able to recognize the elements and dimensions of a space
- The student will be able to demonstrate coherence and continuity in the development of a design process
- The student will be able to analyse their own work and that the work of others by reference to established models of good practice and to appropriate references
- The student will be able to unfold his or her spatial imagination and to express it through sketches and models
- The student will be able to identify the impact that social factors exert on housing design (e.g. existing typologies, building regulations, users’ expectations, etc.)
- The student will be able to demonstrate knowledge of the relevant theoretical background on residential projects

Learning space: Habitat Regeneration Strategies

- Students of architecture will learn how to participate in creation of regeneration strategies
- Students of geography will examine different urban morphologies within the regeneration processes of riverbanks.
- Students will learn how to identify strategies behind observed regeneration examples, with particular interest in habitat issues
- Students will learn what habitat means and how their disciplines are related to its study.

Learning space: Threshold Matters

- The student will be able to reflect on contemporary and innovative architectural-theoretical perspectives
- The student will be able to communicate his/her research from an artistic-architectural perspective in a visual and verbal way
- The student will be able to think and act across cultures
- The student will be able to do research on the necessary resources related with the architectural design process, and explore formally and conceptually relevant examples for the design issue, and make use of all of these research products in the design process
- The student will be able to present their architectural ideas and designs both visually and verbally since all the exercises performed in the studio will be open to discussion and sharing
- The student will be able to develop an awareness for various processes shaping architecture
- The students will be able to achieve the ability of critical thinking on problems related with architecture a social discipline

Learning space: Housing Systems

- The student will be able to conceptualize a residential building as a system (physical and abstract) made of sub-systems which are interrelated
- The student will be able to create a model of a housing system
- The student will be able to play the role of “system designer” rather than of “designer of a building”
- The student will become aware that system design requires the participation of multiple stakeholders including dwellers
- The student will be able to apply system design principles to facilitate the multiple actors involved in housing design to take decisions in their respective decision making realms

Also, in the design of the programmes of the three international workshops, learning outcomes have been jointly described by the partners involved in the design of the learning activities.

Lisbon Workshop

At the end of the workshop students were expected to be able to:

- Explain the interlinking between sustainability, technology and society underlying contemporary living patterns
- Identify concepts and examples concerning these topics: participatory design methods (community participation, participatory design theory and techniques, generative design research); contemporary living patterns (social housing, housing and quality of life, domestic scenario, new ways of life and new family structures); changes of demographic trends and new housing needs; energy efficiency and construction materials and digital tools CAD / CAM (parametric design, modular systems, and digital fabrication)
- Apply methods and design strategies to build a prototype of economically and socially sustainable housing and
- Incorporate contributions from citizens in the customization of digitally fabricated houses

Cottbus Workshop

- The students will be able to gain theoretical insight into the urban processes of growth and shrinkage.
- The students will experience direct contact to urban strategies by research and documentation
- The students will be able to identify and verify urban possibilities in Berlin / Cottbus with regard to the overall topic.

Belgrade Workshop

At the end of the workshop students will be able to:

- Understand the differences between the various approaches to make cities liveable, such as regeneration, renewal and revitalization.
- Identify the specific characteristics of an area which embody a potential for future change.
- Develop a multi-dimensional analysis focusing on environmental, social and psychological aspects of liveable cities as a basis to propose redevelopment strategies
- Understand the importance of climate change as a driving factor to make cities more liveable, renewable and responsive to environmental challenges.
- Propose strategies to revitalise and regenerate cities which allow for the participation of local community representatives.
- Develop processes to transform existing physical structures for other purposes, to refurbish existing buildings, taking allowance of the underlying political and economic forces.

Each of the above mentioned learning activities dealt with a topic about contemporary dwelling, integrated various subject-matters and scales, and/or focused on issues related to specific sites. A next step would be to design a joint learning programme around the theme “Global Dwelling” that embraces these and similar activities which can be carried out in the future.

6 DEFINING LEARNING OUTCOMES AND COMPETENCES FOR “GLOBAL DWELLING”

A first attempt to define “Global Dwelling” might take into consideration the following (Madrazo, 2015):

- The existence of common driving forces influencing the contemporary habitat in different cultures, societies and places, among others: gentrification, mobility, sustainability, and economic and social restructuring.
- The recognition that dwelling as a subject-matter inevitably brings together various scales, disciplines, and areas of expertise, including: architecture and urban planning, sociology and community psychology, economics and finance.
- The challenge of adopting inclusive approaches to identify housing needs and to find appropriate solutions with the joint participation of citizens and experts, community and local representatives, and political and economic organizations

A learning programme aimed at endowing graduates with the skills they need to face the challenges of global dwelling in professional practice necessarily needs to deal with the social, and economic factors that drive globalization. The learning and teaching activities within this program should enable students to approach dwelling from multiple disciplinary perspectives and to exercise the ability to interact with stakeholders with different profiles and expertise, with professionals and laypeople.

Furthermore, a learning programme on “Global Dwelling” would need to adopt pedagogical methods to support the integration of research and community participation, such as “project-based learning”, “research as design”, “designerly research”, and “action research”. Components of these pedagogic models need to be interwoven in the design of learning activities which will enable the student to acquire the competences in the design of the habitat for a global world.

For this purpose, a table of learning outcomes and competences has been elaborated during the project. This work has been strongly interwoven to other project activities, in particular with the work conducted in each of the three project sub-networks: Housing Research, Pedagogical Activities and Community Participation.

6.1 Creating a table of learning outcomes and competences

A survey of research topics on contemporary housing carried out in the sub-network Housing Research (see Deliverable 2.4 “Research matrix- Mapping of research within network”) has been the starting point for creating a list of competences for a “Global Dwelling” learning programme. The purpose of this survey has been to map the research activity at the OIKONET partner organisations in order to facilitate knowledge exchange and collaboration. The outcomes have been compiled in a table (Figure 2.). These activities have been structured in four areas: Sustainability, Participation, Affordable Housing and Housing Regeneration.

| OIKONET REVISED RESEARCH MATRIX | | | | V2 | SUBNETWORK WP2 | | 30/06/2016 |
|--|--|---|---|---|--|--|---|
| The purpose of this research matrix is to record research activities that have informed OIKONET (research, pedagogy, participation) and have led to a particular academic publication. | | | | | | | |
| Research concept | Description | PEDAGOGY | PARTICIPATION | OIKOPEDIA | Reader 1 | Reader 2 | Other publication |
| The research concepts that have emerged as critical and necessary to understand the global dimension of housing. | A brief description of the research concept or theme. | Pedagogic activities that have been informed by this concept. | Participation activities that have been informed by this concept. | OIKOPEDIA entries connected to this concept. | Sections in Reader 1 that have covered this concept. | Sections in Reader 2 that have covered this concept. | Other publications that related to this concept and its link to OIKONET activities. |
| Sustainability | | | | | | | |
| Sustainable or green building construction of housing | It endorses the principals of sustainable development in the siting, design, building, maintenance and occupation of buildings. | | | Urban greening Urban heat islands mitigation | | Chapter 2 | World Renewable Energy Congress WREC XIV paper |
| Energy efficiency in housing | Is concerned with energy performance and is one key aspect influenced by design and cuts across several facets of the society such as social, economic and environmental. | | | Passive Design (RTU) | Chapter 3 | Chapter 5 | |
| Sustainable housing design | Conserve energy, reduce the waste generation and be environmentally equitable. | | | Sustainable Design, Sustainable Design - learning by doing. | Chapter 1 | | |
| Socially sustainable transformation of communities and cities | Maintaining social cohesion and ensuring citizens participation during and after urban transformations. | Learning space "Urban Systems" | | Sustainable Communities, Capacity-building, Interplace, Codesign | Chapter 2 | Chapter 7, Chapter 3 | |
| Economic sustainability | Creating affordable or social housing projects that are economically sustainable in the long term. This means the ability to support or continue indefinitely, without economic repercussions. | | | Sustainable Communities, Housing innovations, Public Rental Housing Programme as Innovation - brief | Chapter 6 | Chapter 6 | |
| Participation | | | | | | | |
| Community, users or citizens' participation | Aims at taking into account inhabitants' requirements in housing design and planning. | Learning space "Civic Housing" | Participatory action "Civic Housing" | Participatory Planning (RTU), Capacity-building, Interplace, Codesign | Chapter 2 | Chapter 7, Chapter 3, Chapter 6 (HIS, RTU) | |
| Citizens' empowerment | Inhabitants are key actors in governance processes aimed at | | | Capacity-building, Interplace, Codesign | Chapter 2 | Chapter 7 | |

Figure 2. View of the OIKONET research matrix (from Deliverable 2.4)

Starting with this table, a first list of competences associated to the research issues identified in the matrix was created (Figure 3).

| | | | | | | | |
|--|---|---|---|--|--|---|---|
| OIKONET revised research matrix_V1 | | | | V1 | SUBNETWORK WP2 | | 25/03/2016 |
| The purpose of this research matrix is to record research activities that have informed OIKONET (research, pedagogy, participation) and have led to a particular academic publication. | | | | | | | |
| Research concept | Description | PEDAGOGY | PARTICIPATION | OIKOPEDIA | Reader 1 | Reader 2 | Other publication |
| The research concepts that have emerged as critical and necessary to understand the global dimension of housing. | A brief description of the research concept or theme. | Pedagogic activities that have been informed by this concept. | Participation activities that have been informed by this concept. | OIKOPEDIA entries connected to this concept. | Sections in Reader 1 that have covered this concept. | Sections in Reader 2 that have covered this concept. | Other publications that related to this concept and its link to OIKONET activities. |
| RESEARCH MAP | | | | | | | |
| Sustainable or green building construction of housing | It endorses the principles of sustainable development in the siting, design, building, maintenance and occupation of buildings. | | | | | | |
| Energy efficiency in housing | Is concerned with energy performance and is one key aspect influenced by design and cuts across several facets of the society such as social, economic and environmental. | | | | | | |
| Sustainable housing design | Conserve energy, reduce the waste generation and be environmentally equitable. | | | | | | |
| Global Dwelling (as practice) | | | | Global Dwelling (as learning competences) | | | |
| Please describe the global dimension of the topics, and propose new topics which relate to global dwelling. Please keep in mind the definitions of "global dwelling" in | | | | Please describe the learning competence that students should acquire to address in their practice as architects the challenges raised the corresponding topic. | | | |
| COMPETENCES TABLE | | | | | | | |
| Sustainability | | | | Skills | | Attitude | |
| Sustainable housing manages existing resources (social, economic, environmental) in a way that does not exhaust the possibilities of future evolution. | | | | To have knowledge of the basic concepts and methods to design sustainable buildings | | | |
| | | | | To understand the impact of climate change | | To develop an attitude towards sustainability | |
| | | | | To know characteristics of materials for sustainable housing | | To be able to include aspects of energy efficiency in new housing designs | |
| | | | | To understand the different layers of sustainability (technical, social, environmental, economical, etc.) | | To be able to use characteristics of materials in housing designs | |
| | | | | To understand flexibility and adaptability as basic concepts of sustainability | | To be able to apply flexibility and adaptability in housing design | |
| | | | | To understand the parameters of social sustainability | | To be able to use parameters of social sustainability in | |

Figure 3. Creating correspondences between the research matrix and the list of competences

In accordance with the structure proposed by the Tuning project, the competences were divided into three components: knowing and understanding (Knowledge), knowing how to act (Skills) and knowing how to be (Attitudes). The template given to partners to describe the competences is shown next.

1. **Knowledge (KNOW - what will students KNOW by the end of the course/curriculum?):**
 - a. KNOW the main concepts of environmental sustainability (Energy efficiency, materials, etc.)
 - b. KNOW the main concepts of social sustainability
 - c. KNOW etc.
2. **Skills (KNOW HOW – what will students BE ABLE TO DO by the end of the course/curriculum?):**
 - a. Design skills: KNOW HOW TO effectively use and apply design methods, etc.
 - b. Communication skills: KNOW HOW TO mediate, interact, cooperate, etc.
 - c. ICT skills: KNOW HOW TO programme in specific languages, use parametric design, etc.
 - d. Strategy skills: KNOW HOW TO work with data sets, KNOW HOW TO discuss the integral nature of housing, etc.
 - e. Management skills: KNOW HOW TO act in uncertainties, KNOW HOW TO manage strategies in public and private; etc.
3. **Attitudes (KNOW HOW TO BE – what will students BE by the end of the course/curriculum?):**
 - a. KNOW HOW TO BE community oriented, inclusive and open to participation
 - b. KNOW HOW TO BE aware of the complex / multidisciplinary nature of housing
 - c. KNOW HOW TO BE etc.

After receiving the answers from partners, a task group was appointed to systematize the inputs received from partners: Leandro Madrazo (LA SALLE), Jim Roche (DIT), Nicolai Steinø (AAU), and Vaso Trova (UTH). The group met during the workshop in Belgrade in June 2016. As a result of this group work, the competences were structured in seven areas:

- **Dwelling in a global and local context**
 - Multiple thresholds
 - Social mix, accessibility and mixed-used
 - Consideration of living at various scales, integrating territorial, urban, building scales
 - Integration of private and public spaces
 - Relations between private and public realm
- **Dwelling practices**
 - Living in a global world
 - Mobility, new family structures (single families, extended families)
 - New understanding of private/public spaces
 - Living and working
 - Gated communities
 - Social housing
 - Large immigration waves, emergency housing
- **Flexible housing design systems**
 - Collaborative design (co-design, co-housing, stakeholder participation)
 - Enhancing the design to use and operation phases (adaptability over time)
 - Multi-use spaces
 - Self-build
- **Environmental sustainability**
 - Climatic design of cities and buildings throughout history and now
 - Impact of climate change (urban resilience)
 - Urban regeneration
 - Compact cities
 - Energy efficiency
 - Sustainable use of physical resources
 - Building from cradle-to-cradle
 - Community resources
 - Sustainable design approaches

- Sustainable inputs (alternative energy solutions)
 - Recycling
 - Food and waste
 - CO2 and energy embodiment
- **Social and cultural resources**
 - Awareness of local cultures (history, memory), expertise (building traditions, traditional practices), climate....
 - Urban sociology (social structures, interactions and conflicts, ...)
 - Study and empowerment of communities
 - Social sustainability
 - Social mix
 - Social engagement
- **Policies and strategies**
 - Financial, political and legal frameworks
 - Policy making
 - Private/public partnerships
 - Engagement of multiple stakeholders
 - Housing procurement
 - Traditional and contemporary tenure systems
 - Housing management systems
 - City branding and image making
- **Innovative construction technologies**
 - Use of ICT to design and building (BIM, simulation)
 - Collaboration and participation,
 - New building systems and materials
 - Industrialization
 - Mass customization
 - Open building

After the meeting in Belgrade, the table of competences was completed and the inputs from the task group members were harmonized.

This is an example of description of the competences at this stage of the process.

| THEMES | TOPICS | KNOW | KNOW HOW | KNOW HOW TO BE |
|---|---|--|--|--|
| | | <i>Knowledge/understanding conveyed by the topics.</i> | <i>Methods, tools and skills needed to acquire the knowledge</i> | <i>The impact of the acquired knowledge on the learner and on the society</i> |
| | | | | |
| Dwelling in a global and local context | <ul style="list-style-type: none"> • Multiple thresholds • Social mix, accessibility and mixed-used • Consideration of living at various scales, integrating territorial, urban, building scales • Integration of private and public spaces • Relations between private and public realm | To understand differences in culture | To identify and critically appraise the design of residential areas which favour the coexistence of different cultures | To recognize that the mix of cultures is a value that needs to be promoted in urban and housing design |
| | | To understand that dwelling cuts across | To use analysis and representation | To foster inclusivity in the urban realm |

| | | | | |
|--|--|---|--|--|
| | | multiple spatial boundaries | techniques with the aim to integrate multiple scales in the design process (e.g. the design of public space as extension of private space) | |
| | | To understand the reciprocal influence between public space and domestic space | To identify and critically appraise the design of housing that is integrated with public spaces; to identify and critically appraise the design of public spaces that improve the liveability of residential areas | To acknowledge the need to assure access to public space to all citizens (right to the city) |
| | | To critically appraise the connection of multiple spatial realms, public and private, in continuous sequences | | |
| | | To identify the transitions between private and public spaces in residential areas | | |
| | | To understand how mobility works across the different territorial scales | | |
| | | To understand that mobility is influenced by social inequalities (e.g. exclusion), and policies | | |

Finally, in order to simplify the competences description, and to clarify the distinction between these and the learning outcomes, the contents collected through this table were restructured in a new table consisting of “Learning Outcomes” and “Competences” (see Appendix A).

| 1. Dwelling in a global and local context: Multiple scales and thresholds in the living space; integration of regional, urban, and building scales; social mix and community integration; accessibility and mixed-used; integration of private and public spaces; forging relations between private and public realms | | | | |
|--|--|--|--|---|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student is able to design residential areas which favour the coexistence of different cultures.</p> <p>The student is able to consider the interrelationships across multiple scales (domestic, urban, regional) in the realization of an architectural/urban project concerned with residential buildings.</p> | <p>The graduate is able to recognize the value of mixing cultures, and promotes this mixture through urban and housing designs.</p> <p>The graduate can critically appraise the qualities of public spaces in relationship to private residences in order to create plans to improve the</p> | <p><i>The graduate is able to prepare and present building design projects of diverse scale, complexity, and type in a variety of contexts, using a range of media, and in response to a brief.</i></p> <p><i>The graduate will have knowledge of the cultural, social and</i></p> | <p><i>Understanding of the relationship between people and buildings and between buildings and their environments, and of the need to relate buildings and the spaces between them to human needs and scale.</i></p> <p><i>Awareness of the issues and themes of present day architectural debate.</i></p> | <p><i>The interrelationship with economic globalisation and regional specialisation on competitive advantage, endogenous resources, sustainable economic development and an inclusive economy.</i></p> <p><i>The experience of spatial planning and</i></p> |

| 1. Dwelling in a global and local context: Multiple scales and thresholds in the living space; integration of regional, urban, and building scales; social mix and community integration; accessibility and mixed-used; integration of private and public spaces; forging relations between private and public realms | | | | |
|---|-----------------------------|--|---|---|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| | liveability of urban areas. | <i>intellectual histories, theories and technologies that influence the design of buildings.</i> | <i>Adequate knowledge of urban design, planning and the skills involved in the planning process</i> | <i>lessons learnt in different contexts and spatial scales; and through international comparative studies of systems.</i> |

The criteria adopted to fill in the table was the following:

- Learning outcomes are defined using active verbs; they are “Statements of what a learner is expected to know, understand and be able to do after successful completion of a process of learning”, as defined in the ECTS User’s Guide (2015).
- Competences have been defined taking into consideration the combination of knowledge, skills and attitudes needed by a graduate in order to address in a holistic manner the challenges raised by contemporary dwelling in professional practice. To ensure the clarity of their meaning, they have been described using the vocabulary of learning outcomes, as recommended by Kennedy, Hyland and Ryan (2009).

To verify the validity and novelty of the proposed learning outcomes and competences, they are aligned to similar competences proposed in previous reports and studies: QAA Subject Benchmark Statement, ENHSA survey and ECTP Guidelines. In some cases, these definitions complement the ones we propose; in other cases, they point to topics we have not considered which should be taken into account in subsequent revisions of the table.

6.2 Applying the learning outcomes and competences table to learning design

The table of learning outcomes and competences is necessarily incomplete and will need to be further enhanced –and its structure and definitions revisited and refined– as it is applied to the design of specific learning activities.

A typical process to apply the table to the learning design would be the following (Figure 4):

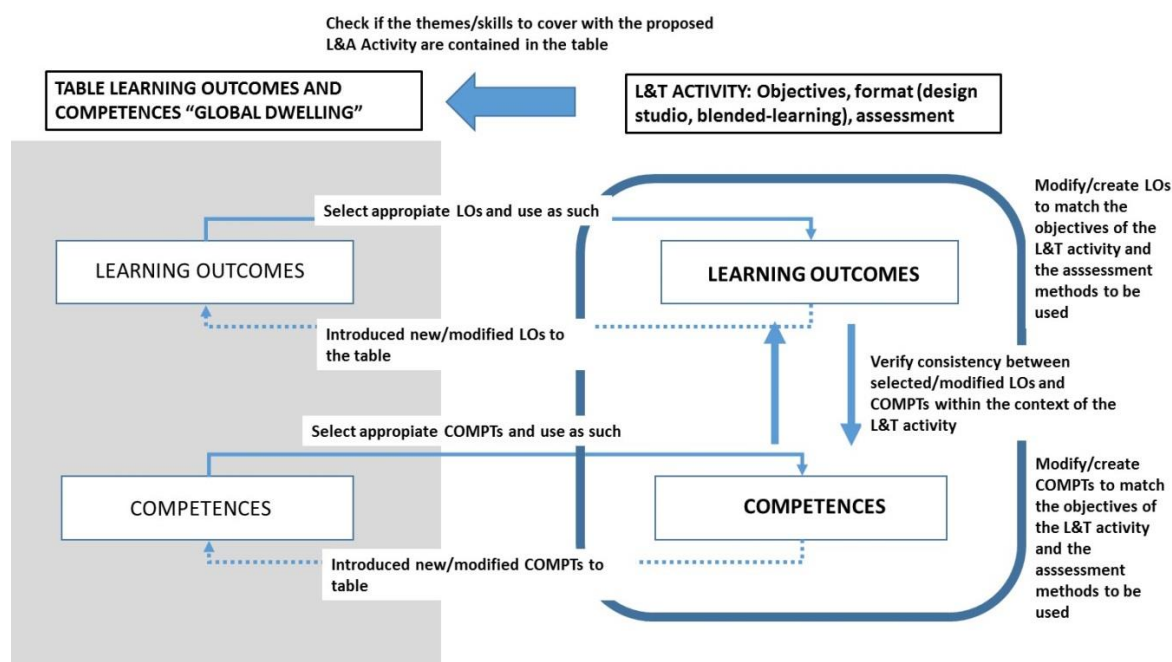


Figure 4. Learning design process using the table of learning outcomes and competences for "Global Dwelling"

1. The objectives of a Learning and Teaching (L&T) activity are contraposed to the learning outcomes and competences contained in the table, to verify if the proposed topic conforms with the vision of an education for "Global Dwelling" captured by it.
2. The learning outcomes and competences that meet the objectives of the L&T are identified in the table. If they suit, they are selected and applied as such; if they do not match, they are modified and adapted to the L&T activity; if they cannot be found, new learning outcomes and/or competences are created and then added to the table.
3. In the process of adding modified/refined learning outcomes and competences to the table, it needs to be verified if the current structure of themes is still valid, or if it they need to be modified (e.g. adding new themes, reformulating the existing themes).
4. The modification of the learning outcomes and competences or the creation of new ones can only be done within the specific context of the proposed L&T activity (i.e., themes, objectives, assessment methods). Also, the alignment of objectives, learning outcomes and competences within the proposed learning context needs to be verified through successive iterations.

7 CONCLUSIONS

We have elaborated a list of learning outcomes and competences to support the learning design of activities focused on the theme “Global Dwelling”. The creation of the list has given us the opportunity to reflect on the relevance and uniqueness of the theme, while identifying the skills and abilities that professional architects and planners require to face the challenges of giving shape to our living environments in the global world. Certainly, both the list of learning outcomes and competences is incomplete, although it is extensive enough to suggest the kind of professional that we need to form with the new housing curricula to be developed in our schools of architecture and planning.

A proper application of pedagogic concepts and methods in architecture and planning programmes has always been a difficult task for educators in these fields. Throughout the joint learning activities carried out in OIKONET we have aimed to systematically apply learning outcomes in the learning design. Their use in the design of collaborative learning activities carried out in a blended-learning environment has been particularly challenging and at the same time, unavoidable. Only by agreeing on the explicit statements of what students will learn can teachers reasonably design a joint learning programme. Furthermore, there are pervading difficulties that make it difficult to apply consistently the constructive alignment methodology to interrelate learning design, learning implementation and learning evaluation. One of them has to do with the rather instinctive tendency –both in students and tutors– to focus on design products, that is, in the urban plans and buildings. Without neglecting the importance of these products, more emphasis needs to be given to the construction of the contexts in which a design emerges: to the definition of the “design problems”, rather than to the “design solutions”; to the acknowledgement of the impact that design decisions have at the social, economic and environmental levels; to the need to include non-professionals in the decision-making process, in a genuine and effective collaboration with professionals. The competences that a professional architect and planner needs to demonstrate in today’s professional practice concerned with the design of the habitat will need to be acquired in more open, inclusive and participatory learning environments.

The table of learning outcomes and competences can be a useful instrument to create a learning programme about “Global Dwelling” to be built with the L&T activities proposed by various institutions and to be carried out within their own curricula or in collaboration with other programmes. The learning outcomes and competences contained in the table will necessarily undergo changes during this process, since they can only be precisely defined within a specific learning context. The successive iterations between the table and the forthcoming L&Ts will necessarily lead to revisit its initial structure (i.e. number of themes and their description) as well as the learning outcomes and competences that it contains (i.e. their number and definitions).

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9 APPENDIX A: TABLE OF LEARNING OUTCOMES AND COMPETENCES

| 1. Dwelling in a global and local context: Multiple scales and thresholds in the living space; integration of regional, urban, and building scales; social mix and community integration; accessibility and mixed-used; integration of private and public spaces; forging relations between private and public realms | | | | | |
|---|--|---|-----------|---|--|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Statement | Benchmark | ENHSA survey | ECTP Guidelines |
| <p>The student is able to design residential areas which favour the coexistence of different cultures.</p> <p>The student is able to consider the interrelationships across multiple scales (domestic, urban, regional) in the realization of an architectural/urban project concerned with residential buildings.</p> <p>The student can apply a variety of analysis and representation tools (data analysis, spatial syntax, concept mapping) in projects that integrate multiple scales.</p> <p>The student is able to design living environments that are the result of connecting various spatial realms at different scales, private and public.</p> <p>The student is able to design</p> | <p>The graduate is able to recognize the value of mixing cultures, and promotes this mixture through urban and housing designs.</p> <p>The graduate can critically appraise the qualities of public spaces in relationship to private residences in order to create plans to improve the liveability of urban areas.</p> <p>The graduate can select a more inclusive housing design process by understanding the environmental impacts -at the social, community and physical levels- that interventions at building scale have at urban scales, and vice versa.</p> <p>The graduate assumes that spaces need to be accessible to all seamlessly through the multiple scales.</p> <p>The graduate is able to</p> | <p><i>The graduate is able to prepare and present building design projects of diverse scale, complexity, and type in a variety of contexts, using a range of media, and in response to a brief.</i></p> <p><i>The graduate will have knowledge of the cultural, social and intellectual histories, theories and technologies that influence the design of buildings.</i></p> <p><i>The graduate will have knowledge of the application of appropriate theoretical concepts to studio design projects demonstrating a reflective and critical approach.</i></p> <p><i>The graduate will have knowledge of the theories of urban design and the planning of communities.</i></p> <p><i>The graduate will have</i></p> | | <p><i>Understanding of the relationship between people and buildings and between buildings and their environments, and of the need to relate buildings and the spaces between them to human needs and scale.</i></p> <p><i>Awareness of the issues and themes of present day architectural debate.</i></p> <p><i>Adequate knowledge of urban design, planning and the skills involved in the planning process</i></p> <p><i>Understanding of the methods of investigation and preparation of the brief for a design project.</i></p> <p><i>Ability to create architectural designs that satisfy both aesthetic and technical requirement.</i></p> <p><i>Awareness of the need for</i></p> | <p><i>The interrelationship with economic globalisation and regional specialisation on competitive advantage, endogenous resources, sustainable economic development and an inclusive economy.</i></p> <p><i>The experience of spatial planning and lessons learnt in different contexts and spatial scales; and through international comparative studies of systems.</i></p> <p><i>The interrelationship between urban and rural spatial systems (e.g. labour and housing markets, energy and transport) and social justice and cohesion, and economic development.</i></p> <p><i>The role of urban design and management to deliver places which are inclusive, safe,</i></p> |

| 1. Dwelling in a global and local context: Multiple scales and thresholds in the living space; integration of regional, urban, and building scales; social mix and community integration; accessibility and mixed-used; integration of private and public spaces; forging relations between private and public realms | | | | |
|---|---|---|--|--|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>transition spaces that connect and separate at the same time private and public realms.</p> <p>The student can integrate various mobility patterns and systems in the design of urban environments, taking into consideration the multiplicity of functions and the variety of needs of dwellers.</p> | <p>create plans and designs that contribute to reduce social inequalities in the mobility of different segments of the population (older people, people with reduced mobility, etc.).</p> | <p><i>knowledge of the current planning policy and development control legislation, including social, environmental and economic aspects, and the relevance of these to design development.</i></p> <p><i>The graduate will have an understanding of the needs and aspirations of building users</i></p> <p><i>The graduate will have an understanding of the way in which buildings fit into their local context.</i></p> <p><i>The graduate will have an understanding of the potential impact of building projects on existing and proposed communities.</i></p> <p><i>The graduate will have an understanding of the need to appraise and prepare building briefs of diverse scales and types,</i></p> <p><i>to define client and user requirements and their appropriateness to site and context</i></p> | <p><i>continuous professional development.</i></p> <p><i>Awareness of the moral and ethical issues of investigation and the need for professional codes of conduct in research (e.g. appropriate acknowledgements of contributions, etc.).</i></p> <p><i>Ability to prepare, process, interpret and present data using appropriate qualitative and quantitative techniques.</i></p> <p><i>Ability to collect and integrate several lines of evidence to formulate and test hypotheses.</i></p> | <p><i>healthy and accessible to all;</i></p> <p><i>Urban composition and organization from the largest to the smallest scale of the urban framework.</i></p> <p><i>Spatial development strategies and statutory development plans as well as master, town, village and conservation plans for buildings, urban areas and the countryside</i></p> |

| 2. Dwelling practices: Living in a global world; Mobility, new family structures (single families, extended families, etc.); new understanding of private/public spaces; living and working at home; gated communities; social housing; large immigration waves, emergency housing | | | | |
|--|--|---|--|---|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student is able to use analysis tools (surveys, statistics) to understand the social dynamics of a community and to derive conclusions from the analysis that can inform the design process.</p> <p>The student is able to identify and critically appraise housing schemes that respond to the needs of the mobile citizen.</p> <p>The student is able to design shelters that are simple, flexible, practical and integrated into the context.</p> <p>The student is able to recognize the processes and dynamics of interaction between people and the spaces they inhabit.</p> <p>The student can critically appraise the sociological and psychological reasons that</p> | <p>The graduate is able to recognize the social dynamics and living patterns of a community and support them by the appropriate spatial design.</p> <p>To graduate has a positive attitude towards the involvement of other disciplines and actors in housing design.</p> <p>The graduate can take into account the implications users having different levels of mobility in housing design in its multiple scales.</p> <p>The graduate has a sensibility towards the variety of living styles that coexist in contemporary societies.</p> <p>The graduate is able to provide appropriate solutions to short-term dwelling needs in today's global societies.</p> | <p><i>The graduate will have knowledge of the cultural, social and intellectual histories, theories and technologies that influence the design of buildings.</i></p> <p><i>The graduate will have knowledge of theories of urban design and the planning of communities.</i></p> <p><i>The graduate will have knowledge of current planning policy and development control legislation, including social, environmental and economic aspects, and the relevance of these to design development.</i></p> <p><i>The graduate will have an understanding of the needs and aspirations of building users.</i></p> <p><i>The graduate will have an understanding of the nature of professionalism and the duties</i></p> | <p><i>Understanding of the relationship between people and buildings and between buildings and their environments, and of the need to relate buildings and the spaces between them to human needs and scale.</i></p> <p><i>Appreciation of the diversity and multicultural quality of contemporary European society.</i></p> <p><i>Capacity to develop an analytical and critical thinking and understanding.</i></p> <p><i>Ability to communicate appropriately to a variety of audiences in oral, written and graphic forms.</i></p> | <p><i>Understanding systems of Mobility and Accessibility in promoting sustainable economic growth, social cohesion and balance in modal choices.</i></p> <p><i>The principles and processes of design in creating high quality places and enhancing the public realm for the benefit of all in society</i></p> |

| 2. Dwelling practices: Living in a global world; Mobility, new family structures (single families, extended families, etc.); new understanding of private/public spaces; living and working at home; gated communities; social housing; large immigration waves, emergency housing | | | | |
|---|--|--|---------------------|------------------------|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>lead social groups to live apart in separate communities</p> <p>The student can incorporate the needs of social groups to the brief of a residential housing project.</p> | <p>The graduate is able to interact with professionals from other disciplines in the analysis of the lived space at different scales.</p> <p>The graduate is open to consider the architect/planner as one more actor in the process of giving meaning to spaces.</p> <p>The graduate is able to meet high-income residents' demands in order to design housing for them while respecting the rights (political, environmental) of other groups of the society.</p> <p>The graduates is able to carry out social housing designs that meet the standards of quality which are socially acceptable by the communities that are living in them.</p> <p>The graduate has a positive attitude towards the integration and co-existence of the various social and economic groups.</p> <p>The graduate is able to prevent social segregation by</p> | <p><i>and responsibilities of architects to clients, building users, constructors, co-professionals and the wider society.</i></p> <p><i>The graduate will have an understanding of the potential impact of building projects on existing and proposed communities.</i></p> <p><i>The graduate will have an understanding of the contributions of architects and co-professionals to the formulation of the brief, and the methods of investigation used in its preparation.</i></p> | | |

| 2. Dwelling practices: Living in a global world; Mobility, new family structures (single families, extended families, etc.); new understanding of private/public spaces; living and working at home; gated communities; social housing; large immigration waves, emergency housing | | | | | |
|---|--|-----------------------|-----------|--------------|-----------------|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Statement | Benchmark | ENHSA survey | ECTP Guidelines |
| | <p>means of appropriate design decisions.</p> <p>The graduate is able to understand and accept the needs of different social groups, from high-income to low-income residents, to carry out designs that satisfy their demands and expectations.</p> | | | | |

| 3. Flexible and adaptable housing: Collaborative design (co-design, co-housing, stakeholder participation); enhancing the design to use and operation phases (adaptability over time); multi-use spaces; self-build | | | | | |
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| LEARNING OUTCOMES | | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student can critically appraise the various meanings associated with the term flexibility in housing design.</p> <p>The student can demonstrate a comprehensive knowledge of a body of precedents about flexible housing schemes.</p> <p>The student can argue the sociological/psychological reasons by which dwellers can</p> | | <p>The graduate is able to design housing buildings that can evolve over time to facilitate their continuous adaptation to the lifestyle of dwellers.</p> <p>The graduate is able to design housing that enable multiple combinations of spaces and functions.</p> <p>The graduate is able to apply</p> | <p><i>The graduate will have the ability to develop a conceptual and critical approach to architectural design that integrates and satisfies the aesthetic aspects of a building and the technical requirements of its construction and the needs of the user.</i></p> <p><i>The graduate will have knowledge of how the theories,</i></p> | <p><i>Ability to create architectural designs that satisfy both aesthetic and technical requirement.</i></p> <p><i>Awareness of the issues and themes of present day architectural debate</i></p> <p><i>Ability to recognize and use appropriately architectural theories, concepts, paradigms</i></p> | <p><i>Techniques in mediation, facilitation, negotiation, advocacy and participation.</i></p> <p><i>The audit of social needs and housing requirements.</i></p> <p><i>Knowledge of systems of representation and participation.</i></p> <p><i>The concepts of rights, and of representative and</i></p> |

| 3. Flexible and adaptable housing: Collaborative design (co-design, co-housing, stakeholder participation); enhancing the design to use and operation phases (adaptability over time); multi-use spaces; self-build | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>transform a house into a home.</p> <p>The student can demonstrate that the built form of a dwelling influences the modes of living and vice versa.</p> <p>The student can appraise the collective, participatory and interdisciplinary activity within housing design.</p> <p>The student can apply basic techniques required for the design and management of participatory processes (communication, social and personal interaction).</p> | <p>methods to recognize different living patterns (i.e. photos, activity maps, diagrams) and to carry out surveys among residents to describe their ways of living.</p> <p>The graduate is able to apply and use the appropriate techniques to analyse how people adapt dwellings to their lifestyle over time.</p> <p>The graduate is able to perform post-occupational analysis to understand the relationships between the design and form of the dwelling and the ways of living.</p> <p>The graduate is able to devise and implement design strategies that facilitate the involvement of multiple actors and disciplines in the design process; to be able to manage community integration processes.</p> <p>The graduate is able to design and manage participatory processes and to efficiently interact with relevant actors and stakeholders.</p> | <p><i>practices and technologies of the arts influence architectural design.</i></p> <p><i>The graduate will have knowledge of theories of urban design and the planning of communities.</i></p> <p><i>The graduate will have an understanding of the needs and aspirations of building users.</i></p> <p><i>The graduate will have an understanding of the role of the architect within the design team and construction industry, recognising the importance of current methods and trends in the construction of the built environment.</i></p> <p><i>The graduate will have an understanding of the potential impact of building projects on existing and proposed communities.</i></p> <p><i>The graduate will have an understanding of the need to critically review precedents relevant to the function, organisation and technological strategy of design proposals.</i></p> | <p><i>and principles</i></p> <p><i>Ability to evaluate evidence and draw appropriate conclusions</i></p> <p><i>Ability to communicate appropriately in written, oral and graphic forms.</i></p> <p><i>Personal and social skills in expression and communication by speaking, writing and sketching.</i></p> | <p><i>participatory democracy.</i></p> <p><i>Involvement & Empowerment of residents, business communities and governmental bodies as well as marginalised and excluded groups in society;</i></p> |

| 3. Flexible and adaptable housing: Collaborative design (co-design, co-housing, stakeholder participation); enhancing the design to use and operation phases (adaptability over time); multi-use spaces; self-build | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| | <p>The graduate demonstrates an open attitude towards collaboration with other stakeholders and disciplines in the housing design process.</p> <p>The graduate assumes the need to engage users in the design process and shows a predisposition towards empowering people in the process of shaping their living environment.</p> | <p><i>The graduate will have an understanding of the need to appraise and prepare building briefs of diverse scales and types, to define client and user requirements and their appropriateness to site and context.</i></p> <p><i>The graduate will have an understanding of the contributions of architects and co-professionals to the formulation of the brief, and the methods of investigation used in its preparation.</i></p> <p><i>The graduate will have an understanding of strategies for building construction, and ability to integrate knowledge of structural principles and construction techniques.</i></p> <p><i>The graduate will have an understanding of the physical properties and characteristics of building materials, components and systems, and the environmental impact of specification choices.</i></p> | | |

| 4. Environmental sustainability: Climatic design of cities and buildings; impact of climate change (urban resilience); urban regeneration; compact cities; energy efficiency; sustainable use of resources; building from cradle-to-cradle; sustainable design; recycling; carbon emissions reduction; embedded energy | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Statement | Benchmark | ENHSA survey |
| <p>The student recognizes the consequences of climate change on urban form and planning, dwelling patterns and housing design.</p> <p>The student appraises the relationship between climate and urban and building form and design.</p> <p>The student can describe the basic concepts and methodologies needed to design sustainable living environments at its various scales.</p> <p>The student recognizes the importance of regeneration as a way to preserve social identity and spatial culture.</p> <p>The student can describe the key concepts and methodologies to avoid urban island heat effect in the planning of urban spaces.</p> <p>The student recognizes the importance of material</p> | <p>The graduate can use appropriate tools to evaluate the impact of climate change, considering sustainability as a design objective.</p> <p>The graduate has a sensitivity towards the importance of creating sustainable living environments and recognizes the need to apply environmental strategies to housing.</p> <p>The graduate is able to apply techniques to verify that housing designs comply with energy efficiency requirements.</p> <p>The graduate recognizes the need to design and build buildings that are energy efficient.</p> <p>The graduate is able to use an inventory of green solutions and to choose the most suitable ones according to the</p> | <p><i>The graduate will have the ability to understand the constructional and structural systems, the environmental strategies and the regulatory requirements that apply to the design and construction of a comprehensive design project.</i></p> <p><i>The graduate will have the ability to develop a conceptual and critical approach to architectural design that integrates and satisfies the aesthetic aspects of a building and the technical requirements of its construction and the needs of the user.</i></p> <p><i>The graduate will have knowledge of the influence of the design and development of cities, past and present, on the contemporary built environment.</i></p> <p><i>The graduate will have knowledge of current planning policy and development control legislation, including social,</i></p> | <p><i>Ability to develop a trans-disciplinary understanding.</i></p> <p><i>Ability to use IT and Internet resources (statistical, cartographical methods, database creation, etc.).</i></p> <p><i>High level computing skills including the ability to use the Internet critically as a means of communication and a source of information.</i></p> <p><i>Ability to evaluate evidence and draw appropriate conclusions.</i></p> | <p><i>The maintenance, enhancement and creation of natural resources including air quality, water regimes, soil conditions, forestry, agricultural systems, green corridors and maritime resources.</i></p> <p><i>The intrinsic value of ecosystems (for example: natural resources, biodiversity, energies, water, waste management)</i></p> <p><i>Mitigation and adaptation to the effects of climate change.</i></p> <p><i>Understanding the scope of non-polluting and renewable energy resources, to meet the needs of 21st century, especially in transportation and domestic building.</i></p> <p><i>The application of projections, developing options and scenarios and their evaluation.</i></p> <p><i>Urban regeneration and</i></p> |

| 4. Environmental sustainability: Climatic design of cities and buildings; impact of climate change (urban resilience); urban regeneration; compact cities; energy efficiency; sustainable use of resources; building from cradle-to-cradle; sustainable design; recycling; carbon emissions reduction; embedded energy | | | | |
|--|--|---|---------------------|---|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>recycling in construction.</p> <p>The student is able to integrate design recycling mechanisms into both the urban and building scale.</p> <p>The student is able to recognize the interrelationships between political, economic and social realms in urban regeneration programs.</p> <p>The student can assess the implications of densification for different stakeholders (residents, local representatives, planners, state and regional authorities, etc.).</p> <p>To student can identify key global and local factors which cause the deprivation of the urban environment.</p> <p>The student is able to use simulation tools to inform the decisions in specific realms of the design of sustainable environments (energy, transport).</p> <p>The student can apply life-cycle assessment tools to</p> | <p>local context.</p> <p>The graduate is able to use computer software to evaluate the energy efficiency of designs (residential buildings, and urban areas).</p> <p>The graduate is able to intervene in the planning and execution of multidimensional analyses of urban areas to be regenerated, including: site analysis, surveys with key actors, information analysis (media, statistics, databases).</p> <p>The graduate has the skills to facilitate dialogue among the multiple actors involved in urban regeneration programs with the purpose of arriving at proposals that respond to the interest of the communities.</p> <p>The graduate is able to conduct a morphological analysis of an urban area to propose appropriate densification strategies.</p> <p>The graduate is able to convey reasoned arguments for densification balanced against provision of amenity.</p> | <p><i>environmental and economic aspects, and the relevance of these to design development.</i></p> <p><i>The graduate will have an understanding of the impact of buildings on the environment, and the precepts of sustainable design.</i></p> <p><i>The graduate will have an understanding of the way in which buildings fit into their local context.</i></p> <p><i>The graduate will have an understanding of the physical properties and characteristics of building materials, components and systems, and the environmental impact of specification choices.</i></p> <p><i>The graduate will have knowledge of principles associated with designing optimum visual, thermal and acoustic environments.</i></p> <p><i>The graduate will have knowledge of systems for environmental comfort realised within relevant precepts of sustainable design.</i></p> <p><i>The graduate will have</i></p> | | <p><i>renewal programmes and policies, with an understanding of development finance, developer contributions and added value for the community.</i></p> |

| 4. Environmental sustainability: Climatic design of cities and buildings; impact of climate change (urban resilience); urban regeneration; compact cities; energy efficiency; sustainable use of resources; building from cradle-to-cradle; sustainable design; recycling; carbon emissions reduction; embedded energy | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>evaluate the sustainability of a design solution, from building to urban scales.</p> <p>The student can apply environmental assessment tools (e.g. Leed, Bream) to evaluate the impact of designs at various scales.</p> | <p>The graduate is able to carry out inventories of existing urban resources (buildings, open spaces, natural elements, derelict industrial buildings, urban spaces, etc.) in order to develop housing regeneration strategies.</p> <p>The graduate has a positive attitude towards reusing urban resources.</p> | <p><i>knowledge of strategies for building services, and ability to integrate these in a design project.</i></p> | | |

| 5. Social and cultural resources: Awareness of local cultures (history, memory) and expertise (building traditions, traditional practices); urban sociology (social structures, interactions and conflicts); study and empowerment of communities; social sustainability; social mix; social engagement | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student can critically appraise the influence of technology, climate, social and cultural traditions on living cultures at the local and global level.</p> <p>The student can describe the characteristics of sustainable living environments.</p> | <p>The graduate is able to examine social structures and their underlying living patterns, formal and informal.</p> <p>The graduate is able to work in multicultural environments, showing a positive attitude towards differences in culture.</p> <p>The graduate is able identify</p> | <p><i>The graduate will have the ability to develop a conceptual and critical approach to architectural design that integrates and satisfies the aesthetic aspects of a building and the technical requirements of its construction and the needs of the user.</i></p> | <p><i>Ability to identify and use appropriately sources of relevant information and to identify and use relevant retrieval tools (bibliographical sources, archival inventories, etc.).</i></p> <p><i>Ability to develop a trans-disciplinary understanding.</i></p> | <p><i>The audit of social needs and housing requirements.</i></p> <p><i>Policy frameworks, for example, responding to the demographic and economic shifts and the demands that arise or relating to aging population, ethnicity, cultural needs and gender.</i></p> |

| 5. Social and cultural resources: Awareness of local cultures (history, memory) and expertise (building traditions, traditional practices); urban sociology (social structures, interactions and conflicts); study and empowerment of communities; social sustainability; social mix; social engagement | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student can critically argue the necessity of reinforcing a mix of cultures to achieve sustainable communities.</p> <p>The student is able to recognize the diversity of social practices and interactions in public spaces.</p> | <p>and critically appraise the design of dwellings that are respectful of the local culture and adapted to contemporary demands.</p> <p>The graduate has the knowledge and sensitivity to grasp the identity of a place.</p> <p>The graduate is able to be respectful and appreciative of the values of a place.</p> <p>The graduate can apply scientific methods (e.g. space syntax) to analyse the uses of public spaces and to use the results in the design process.</p> | <p><i>The graduate will have knowledge of: the influence of history and theory on the spatial, social, and technological aspects of architecture</i></p> <p><i>The graduate will have knowledge of current planning policy and development control legislation, including social, environmental and economic aspects, and the relevance of these to design development.</i></p> <p><i>The graduate will have an understanding of the impact of buildings on the environment, and the precepts of sustainable design.</i></p> <p><i>The graduate will have an understanding of the way in which buildings fit into their local context.</i></p> <p><i>The graduate will have an understanding of the potential impact of building projects on existing and proposed communities.</i></p> <p><i>The graduate will have the skills to critically examine the financial factors implied in</i></p> | <p><i>Ability to evaluate evidence and draw appropriate conclusions.</i></p> | <p><i>The principles of inclusion, equality and equal opportunities.</i></p> <p><i>The impact of differing social and political agenda upon planning.</i></p> <p><i>Cultural diversity and identity, including the role of social, cultural and historical heritage and character</i></p> |

| 5. Social and cultural resources: Awareness of local cultures (history, memory) and expertise (building traditions, traditional practices); urban sociology (social structures, interactions and conflicts); study and empowerment of communities; social sustainability; social mix; social engagement | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| | | <i>varying building types, constructional systems, and specification choices, and the impact of these on architectural design.</i> | | |

| 6. Policies and strategies: Financial, political and legal frameworks; housing policies; private/public partnerships in housing procurement; housing management systems; city branding | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student can state the basic financial mechanisms that are necessary to carry out housing programs.</p> <p>The student can state how the housing market works, at the local and global scales.</p> <p>To student can apply legal regulations to planning and design to a specific context.</p> <p>The student can recognize the value that architecture and urban planning and design has in the marketing of the city</p> | <p>The graduate can take into account financial aspects in the design of proposals and strategies aimed at improving housing conditions, at various scales.</p> <p>The graduate is able to participate in the search of innovative procurement and funding schemes.</p> <p>The graduate is able to compare and contrast the varied tenure systems globally applied.</p> <p>The graduate is able to</p> | <p><i>The graduate will have the ability to prepare and present building design projects of diverse scale, complexity, and type in a variety of contexts, using a range of media, and in response to a brief</i></p> <p><i>The graduate will have knowledge of current planning policy and development control legislation, including social, environmental and economic aspects, and the relevance of these to design development.</i></p> | <p><i>Ability to develop a trans-disciplinary understanding.</i></p> <p><i>Ability to use IT and Internet resources (statistical, cartographical methods, database creation, etc.).</i></p> <p><i>High level computing skills including the ability to use the Internet critically as a means of communication and a source of information.</i></p> <p><i>Ability to evaluate evidence and draw appropriate conclusions.</i></p> | <p><i>The impact of differing social and political agenda upon planning</i></p> <p><i>An up-to-date economic topics, such as property rights and property market.</i></p> <p><i>The contribution of spatial planning to local economic development.</i></p> <p><i>The political, legal and institutional context of planning practice both at the national level and at the (evolving) international i.e. European</i></p> |

| 6. Policies and strategies: Financial, political and legal frameworks; housing policies; private/public partnerships in housing procurement; housing management systems; city branding | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| image. | <p>propose funding models adequate to carry out a design proposal aimed at improving housing conditions, at various scales.</p> <p>The graduate is able to participate in the search of innovative ways to reduce the cost of housing and supply it for every family to buy or rent.</p> <p>The graduate is able to understand the influence of political, social and environmental strategies on housing for short, medium and long terms and to take them into account in the housing design provision,</p> <p>The graduate is able to contribute to city-branding initiatives without neglecting the fundamental values of a socially responsible architecture,</p> | <p><i>The graduate will have an understanding of the nature of professionalism and the duties and responsibilities of architects to clients, building users, constructors, co-professionals and the wider society</i></p> <p><i>The graduate will have the skills to critically examine the financial factors implied in varying building types, constructional systems, and specification choices, and the impact of these on architectural design.</i></p> <p><i>The graduate will have the skills to understand the cost control mechanisms which operate during the development of a project.</i></p> <p><i>The graduate will have knowledge of the fundamental legal, professional and statutory responsibilities of the architect, and the organisations, regulations and procedures involved in the</i></p> | | <p>level.</p> <p><i>Comparative knowledge of planning practice across Europe.</i></p> <p><i>Familiarity with planning instruments and directives (e.g. Water Framework, Air quality, EIA & SEA);</i></p> <p><i>Knowledge of national and local legislation and ability to formulate norms and directives for planning instruments.</i></p> <p><i>Policy frameworks, for example, responding to the demographic and economic shifts and the demands that arise or relating to aging population, ethnicity, cultural needs and gender;</i></p> |

| 6. Policies and strategies: Financial, political and legal frameworks; housing policies; private/public partnerships in housing procurement; housing management systems; city branding | | | | |
|---|-------------|---|--------------|-----------------|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| | | <p><i>negotiation and approval of architectural designs, including land law, development control, building regulations and health and safety legislation.</i></p> <p><i>The graduate will have knowledge of the basic management theories and business principles related to running both an architects' practice and architectural projects, recognising current and emerging trends in the construction industry.</i></p> | | |

| 7. Innovative technologies: Use of ICT to design and building (BIM, simulation); collaboration and participation; new building systems and materials; industrialization and lean construction; mass customization; open building | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| The student can describe building materials and systems, traditional and innovative, and can choose the appropriate ones for a particular residential project. | The graduate is able to use local materials and techniques without neglecting experimentation with innovative building components and systems. | <i>The graduate will have the ability to understand the constructional and structural systems, the environmental strategies and the regulatory requirements that apply to the design and construction of a</i> | <i>Ability to identify and use appropriately sources of relevant information and to identify and use relevant retrieval tools (bibliographical sources, archival inventories, etc.).</i> | <p><i>Cadastre analysis, Graphics, visualisation and GIS technique</i></p> <p><i>Technical competence in the use of spatial configuration tools in 2D or 3D and share</i></p> |

| 7. Innovative technologies: Use of ICT to design and building (BIM, simulation); collaboration and participation; new building systems and materials; industrialization and lean construction; mass customization; open building | | | | |
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| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| <p>The student can describe the principles of Integrated Project Delivery (IPD) and their relationship with Building Information Modelling (BIM).</p> <p>To student can use BIM software in the design and construction process of residential buildings.</p> <p>The student can use energy simulation, structural analysis, cost-estimating tools to take informed decisions in the design process.</p> | <p>The graduate knows how to use the materials that are appropriate for each particular situation, taking into consideration budget, climatic conditions, vernacular traditions and building use.</p> <p>The graduate knows how to apply the IPD methodology to engage different actors (owners, consultants, etc.) at the early stages of the design process, using BIM as a communication tool.</p> <p>The graduate is able to use digital fabrication techniques throughout the design and building process.</p> | <p><i>comprehensive design project.</i></p> <p><i>The graduate will have knowledge of the cultural, social and intellectual histories, theories and technologies that influence the design of buildings.</i></p> <p><i>The graduate will have an understanding of the role of the architect within the design team and construction industry, recognising the importance of current methods and trends in the construction of the built environment.</i></p> <p><i>The graduate will have an understanding of the need to critically review precedents relevant to the function, organisation and technological strategy of design proposals.</i></p> <p><i>The graduate will have an understanding of the investigation, critical appraisal and selection of alternative structural, constructional and material systems relevant to architectural design.</i></p> <p><i>The graduate will have an understanding of strategies for</i></p> | <p><i>Ability to create architectural designs that satisfy both aesthetic and technical requirement.</i></p> <p><i>High level computing skills including the ability to use the Internet critically as a means of communication and a source of information.</i></p> | <p><i>information for governments or communities.</i></p> <p><i>Use of information technology to obtain, analyse and present information including foresight analyses and evaluation.</i></p> |

| 7. Innovative technologies: Use of ICT to design and building (BIM, simulation); collaboration and participation; new building systems and materials; industrialization and lean construction; mass customization; open building | | | | |
|--|-------------|--|--------------|-----------------|
| LEARNING OUTCOMES | COMPETENCES | QAA Subject Benchmark Statement | ENHSA survey | ECTP Guidelines |
| | | <p><i>building construction, and ability to integrate knowledge of structural principles and construction techniques.</i></p> <p><i>The graduate will have an understanding of the physical properties and characteristics of building materials, components and systems, and the environmental impact of specification choices.</i></p> | | |