UNIVERSITÀ DI PARMA
DIPARTIMENTO DI INGEGNERIA E ARCHITETTURA
CORSO DI LAUREA IN ARCHITETTURA E CITTA' SOSTENIBILI

BUILDING INFORMATION MODELING:
DIGITAL MODELING OF ARCHITECTURE
DIGITAL VISUALIZATION OF PROJECT

A.A. 2022-2023, Prof. Sandra Mikolajewska

TOPICS OF TODAY:

- COURSE PRESENTATION.

- QUESTIONNAIRE.

- INTRODUCTION TO DIGITAL MODELING.

- INTRODUCTION TO PROJECT COMMUNICATION.

ENTRY REQUIREMENTS

1. STUDENTS ARE EXPECTED TO HAVE A BASIC KNOWLEDGE OF ENGLISH (the lessons will take place entirely in English and will strongly encourage the active participation of the students).
2. STUDENTS ARE EXPECTED TO HAVE IN-DEPTH KNOWLEDGE OF CAD SOFTWARE (the first design phase will be carried out using AutoCAD software) AND A BASIC KNOWLEDGE OF RASTER AND VECTOR GRAPHICS.

LEARNING GOALS

1. STUDENTS ARE EXPECTED TO ACQUIRE THE KNOWLEDGE NECESSARY FOR THE COMPLETE COMMUNICATION OF THE ARCHITECTURAL PROJECT, THROUGH THE ELABORATION OF THREE-DIMENSIONAL MODELS DEVELOPED USING BIM METHODOLOGY.
2. STUDENTS ARE EXPECTED TO ACQUIRE THE KNOWLEDGE NECESSARY FOR THE COMPLETE REPRESENTATION OF THE ARCHITECTURAL PROJECT, THROUGH DRAWINGS AIMED AT ITS COMMUNICATION FROM A DIMENSIONAL, FORMAL AND TECHNICAL POINT OF VIEW.
3. STUDENTS ARE EXPECTED TO IMPROVE THEIR ABILITY OF CRITICAL ANALYSIS OF THE ARCHITECTURAL DESIGN PROCESS.

THE LESSONS WILL TAKE PLACE IN THE CLASSROOM, WITH A SERIES OF **FRONTAL LECTURES** IN WHICH DIGITAL PRESENTATIONS WILL BE PROJECTED. IN ORDER TO STRENGTHEN THE THEORETICAL NOTIONS, THE **PRACTICAL LESSONS** ARE ALSO PLANNED.

CLASS ATTENDANCE IS STRONGLY RECOMMENDED AS WELL AS **CLASS PARTICIPATION**.

DURING THE COURSE, STUDENTS WILL BE ASKED TO PREPARE **SHORT PRESENTATIONS** REGARDING THE MID-TERM EXERCISES AND THE **FINAL PROJECT**.
THE FINAL PROJECT WILL BE CARRIED OUT BY A **GROUP OF TWO STUDENTS**.
THE **FINAL PROJECT** WILL BE PERIODICALLY DISCUSSED AND REVIEWED IN ORDER TO ASSESS PROGRESS AND SOLVE ANY ISSUES.

THE FINAL PROJECT…

	DATE
	February 21
1	February 28
2	March 7
3	March 14
4	March 21
5	March 28
	April 4
	April 11
6	April 18
	April 25
7	May 2
8	May 9
9	May 16
10	May 23
11	May 30

LESSONS TIMETABLE
February 20, - June 01, 2023
Class suspension: April 3-14, 2023

CLASS MEETING TIME
9.30am-12.30pm
1.30pm-4.30pm

CLASSROOM
Plesso Ingegneria Didattica
Aula Disegno 1

OFFICE HOURS
by appointment

E-MAIL
sandra.mikolajewska@unipr.it

EXAM SESSIONS
2° session (June 5 - August 4, 2023)
June, 19 - 8.30
July, 3 - 8.30
July, 17 - 8.30

3 °session (August 21– September 15, 2023)
August, 28 - 8.30
September, 11 - 8.30

1	Course presentation. Introduction to digital modeling and project communication.	Technical language.
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1	Course presentation. Introduction to digital modeling and project communication.	Technical language.
2	Introduction to BIM methodology and BIM standards.	The evolution of the architectural drawing.
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1	Course presentation. Introduction to digital modeling and project communication.	Technical language.
2	Introduction to BIM methodology and BIM standards.	The evolution of the architectural drawing.
3	BIM softwares. Introduction to Autodesk Revit. Understanding families, constraints and parameters. User Interface.	20th-Century architecture communication.
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4	Revit. Part 1. General settings; importing files from AutoCAD; conceptual modeling and solar analysis.	**Project revision.**
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4	Revit. Part 1. General settings; importing files from AutoCAD; conceptual modeling and solar analysis.	**Project revision.**
5	Revit. Part 2. Creating walls, floors, doors, windows, roofs; rooms and schedules.	Contemporary architecture communication.
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4	Revit. Part 1. General settings; importing files from AutoCAD; conceptual modeling and solar analysis.	**Project revision.**
5	Revit. Part 2. Creating walls, floors, doors, windows, roofs; rooms and schedules.	Contemporary architecture communication.
6	Revit. Part 3. Creating structural part: foundations, pilasters, beams.	**Project revision and presentations.**
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6	Revit. Part 3. Creating structural part: foundations, pilasters, beams.	**Project revision and presentations.**
7	Revit. Part 4. Creating stairs and railings.	Introduction to project communication through digital renderings.
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5	Revit. Part 2. Creating walls, floors, doors, windows, roofs; rooms and schedules.	Contemporary architecture communication.
6	Revit. Part 3. Creating structural part: foundations, pilasters, beams.	**Project revision and presentations.**
7	Revit. Part 4. Creating stairs and railings.	Introduction to project communication through digital renderings.
8	Revit. Part 5. Loadable families. Creating parametric 3D and 2D families.	Relationship between visual arts (photography) and architecture communication. Composition analysis.
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5	Revit. Part 2. Creating walls, floors, doors, windows, roofs; rooms and schedules.	Contemporary architecture communication.
6	Revit. Part 3. Creating structural part: foundations, pilasters, beams.	**Project revision and presentations.**
7	Revit. Part 4. Creating stairs and railings.	Introduction to project communication through digital renderings.
8	Revit. Part 5. Loadable families. Creating parametric 3D and 2D families.	Relationship between visual arts (photography) and architecture communication. Composition analysis.
9	Revit. Part 6. Project documentation, sheet management. Rendering.	Images post-processing. Introduction to raster graphics editor software: Adobe Photoshop.
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9	Revit. Part 6. Project documentation, sheet management. Rendering.	Images post-processing. Introduction to raster graphics editor software: Adobe Photoshop.
10	Architectural Rendering. Introduction to rendering software: LUMION.	**Project revision.**
11		

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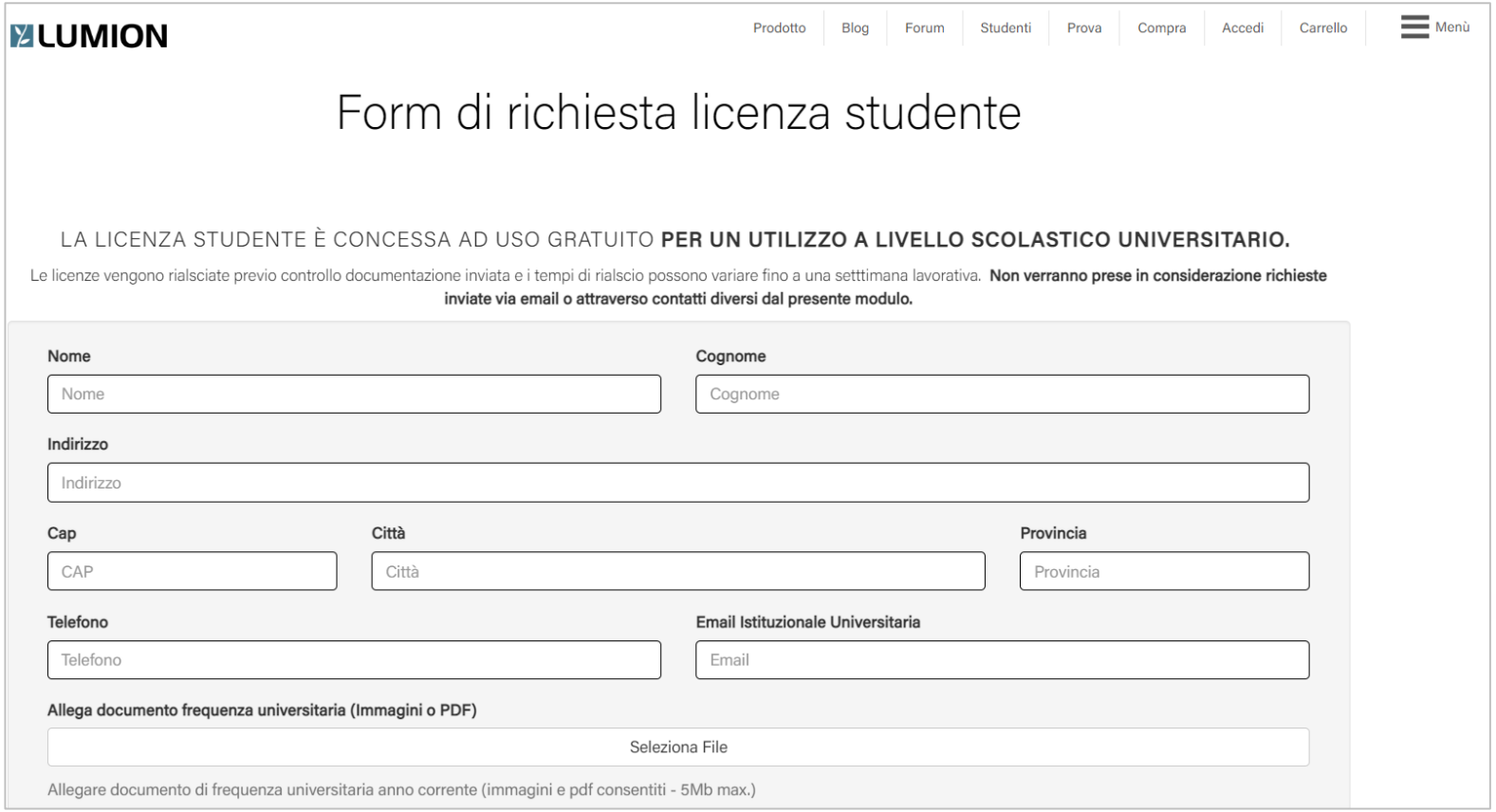
9	Revit. Part 6. Project documentation, sheet management. Rendering.	Images post-processing. Introduction to raster graphics editor software: Adobe Photoshop.
10	Architectural Rendering. Introduction to rendering software: LUMION.	**Project revision.**
11	Introduction to H-BIM. Revit. Part 7. Point cloud management.	**Project revision.**

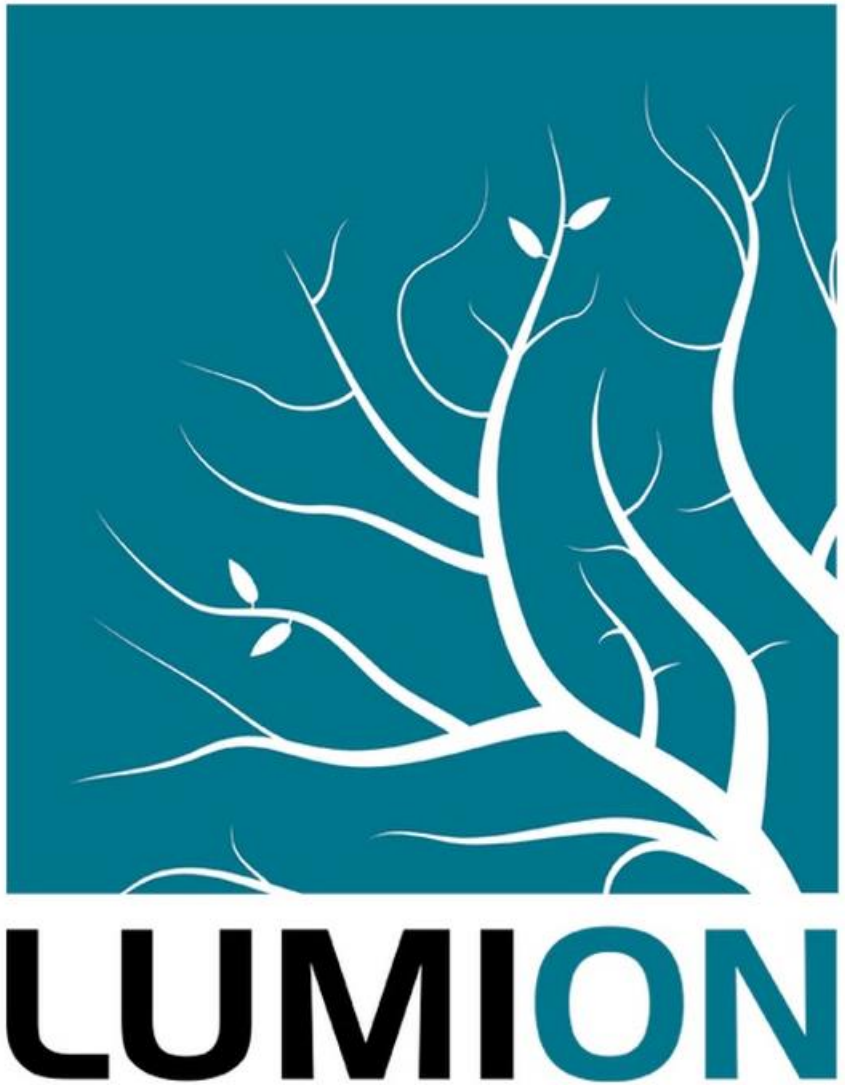
REVIT EDUCATIONAL LICENSE:
https://www.autodesk.com/education/edu-software/overview?sorting=featured&filters=individual

Revit
Support and learning

https://knowledge.autodesk.com/support/revit?search_type=browse&category=Videos&mediaType=Video&sort=score&p=RVT&p_disp=Revit&category_desc=Sometimes%20you%20just%20need%20to%20see%20how%20to%20do%20something.%20Our%20videos%20show%20you%20how%20to%20accomplish%20a%20task%20or%20solve%20a%20problem%20so%20you%20can%20get%20back%20to%20work.

LUMION EDUCATIONAL LICENSE:
https://www.lumion3d.it/lumion-educational-per-lo-studente/





DI GIUDA G.M., VILLA V., **IL BIM. GUIDA COMPLETA AL BUILDING INFORMATION MODELING PER COMMITTENTI, ARCHITETTI, INGEGNERI, GESTORI IMMOBILIARI E IMPRESE**. HOEPLI, 2016.

EASTMAN C., LEE G., TEICHOLZ P., SACKS R., **BIM HANDBOOK: A GUIDE TO BUILDING INFORMATION MODELING FOR OWNERS, DESIGNERS, ENGINEERS, CONTRACTORS AND FACILITY MANAGERS**. JOHN WILEY & SONS, 2018.

POZZOLI S., BONAZZA M., VILLA S., **AUTODESK REVIT ARCHITECTURE 2017. GUIDA ALLA PROGETTAZIONE BIM**. TECNICHE NUOVE, 2016.

AA.VV. (ED. C. MEZZETTI), **IL DISEGNO DELL'ARCHITETTURA ITALIANA NEL XX SECOLO**. EDIZIONI KAPPA, 2003.

CANCIANI M., **I DISEGNI DI PROGETTO. COSTRUZIONI, TIPI E ANALISI**. CITTÀSTUDI EDIZIONI, 2009.

FREEMAN M., **THE PHOTOGRAPHER'S EYE: COMPOSITION AND DESIGN FOR BETTER DIGITAL PHOTOGRAPHS.** TAYLOR & FRANCIS GROUP, 2017.

DOCCI M.,MAESTRI D.,GAIANI M.,**SCIENZA DEL DISEGNO**,CITTÀSTUDI EDIZIONI, 2011.

BULLETTI P., **INGLESE PER L'ARCHITETTURA - ENGLISH FOR ARCHITECTURE**, DIZIONARIO TECNICO PER L'ARCHITETTURA, LE COSTRUZIONI, L'URBANISTICA E IL SETTORE IMMOBILIARE E LEGALE. ITALIANO/INGLESE, INGLESE/ITALIANO. GRUPPO 24 ORE, 2010.

CHING F. D. K. , **A VISUAL DICTIONARY OF ARCHITECTURE.** JOHN WILEY & SONS INC, 2011.

CHING F. D. K. , **FORM, SPACE, AND ORDER.** JOHN WILEY & SONS INC, 2007.

CHING F. D. K., JUROSZEK S.P., **DESIGN DRAWING.** JOHN WILEY & SONS INC, 2010.

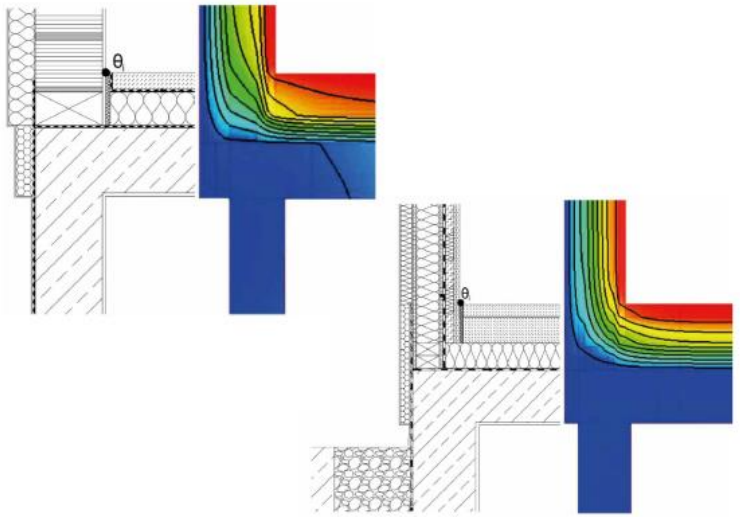
ADDITIONAL RESOURCES, SUCH AS DOCTORAL DISSERTATIONS AND SCIENTIFIC ARTICLES, WILL BE PRESENTED DURING CLASS AND WILL BE UPLOADED ON THE COURSE'S PAGE (**ELLY PLATFORM**).

- MANUALE DELL'ARCHITETTO

- CATALOGO NODI COSTRUTTIVI, CASA CLIMA
https://www.agenziacasaclima.it/it/catalogo-casaclima-esempi-costruttivi-standard--10-1183.html

KlimaHaus CasaClima®

Katalog gängiger Bauteilanschlüsse
Catalogo Nodi Costruttivi



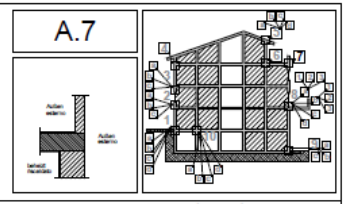
2022

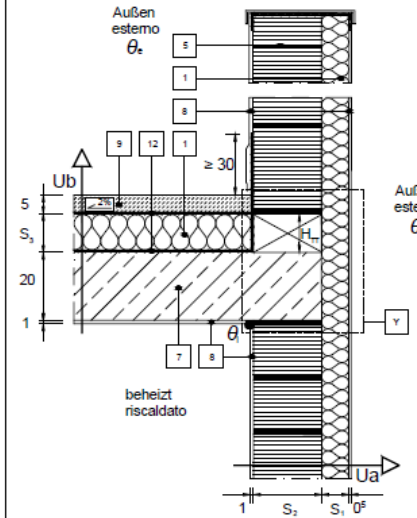
WANDTYP/TIPO DI PARETE

A.7

ZIEGELMAUERWERK, MIT AUSSENDÄMMUNG

MURATURA IN LATERIZIO CON COIBENTAZIONE ESTERNA





VERTIKALSCHNITT-SEZIONE VERTICALE

		A,B,C	D,E	F_{TI}	F_{TA}
[cm]	S_1	5	8	12	8
	S_2	26	20	20	20
	S_3	12	15	20	10
[°C]	θ_e	+6	+0	-6	-6
	θ_i	+17,0	+17,1	+17,0	+14,1

$[\lambda_{eq}]$ Äquivalente λ-Werte Thermische Trennung
Conducibilità equivalente taglio termico

$[H_{TI}]$ Höhe Thermische Trennung
Altezza elemento taglio termico

		A,B,C	D,E	F_{TI}	F_{TA}
[W/mK]	λ_{eq}		0,04	0,04	
[cm]	H_{TI}		10	10	

[Y] Der Bauanschluss ist hinsichtlich Feuchte- und Schallschutz zu überprüfen.
Valutare il dettaglio da un punto di vista igrotermico e acustico.

M	SYMBOL SIMBOLO	BESCHREIBUNG DESCRIZIONE		[W/mK]
1		Wärmedämmung Coibentazione		0,04
		Porenbetonsteine Blocchi in cls areato autoclavati		0,08
		Planziegel Blocchi in laterizio rettificati	vert. orizz.	0,90 0,10
		Gipskartonplatte - Cartongesso		0,21
5		Hochlochziegel porosiert Blocchi in laterizio porizzato		0,23
6		Holz - Legno massiccio / Holzschalung - Tavole di legno		0,13

M	SYMBOL SIMBOLO	BESCHREIBUNG DESCRIZIONE	[W/mK]
7		Stahlbeton - Cls armato	2,50
8		Putz - Intonaco	0,70
9		Estrich - Massetto	1,40
10		Wärmedämmender Leichtestrich Sottofondo alleggerito termoisolante	0,10
		Vollziegel - Mattone pieno	0,70
12▲		Funktionale Schicht - Strato funzionale	2,00

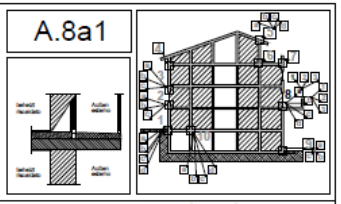
Bei den Bauteilanschlüssen handelt es sich um keine Ausführungsdetails, sie dienen ausschließlich der Betrachtung der thermischen Mindestanforderungen.
I presenti dettagli definiscono una soluzione minima per la sola valutazione termica, non sono esecutivi di cantiere.
▲ Allgemeine Angabe die vom Planer überprüft werden muss.
Indicazione generica che deve essere verificata dal progettista.

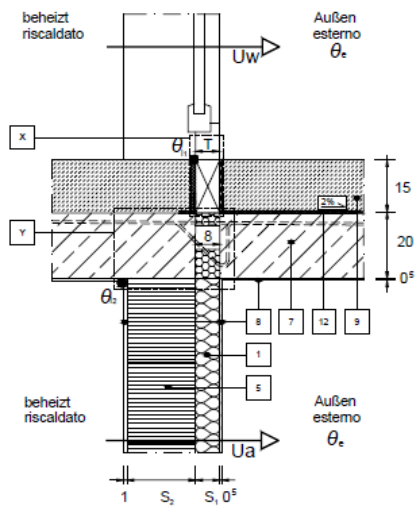
WANDTYP/TIPO DI PARETE

A.8a1

ZIEGELMAUERWERK, MIT AUSSENDÄMMUNG

MURATURA IN LATERIZIO CON COIBENTAZIONE ESTERNA





VERTIKALSCHNITT-SEZIONE VERTICALE

		A,B,C	D,E	F_{TI}	F_{TA}
[cm]	S_1	5	8	8	8
	S_2	26	20	20	20
	θ_e	+6	+0	-6	-6
[°C]	θ_{i1}	+17,5	+16,5	+16,4	+14,5
	θ_{i2}	+19,1	+18,8	+18,5	+18,3

[T] Dicke des Fensterrahmens
Spessore del telaio
$[\lambda_{eq}]$ Äquivalente λ-Werte von Blindstock
Conducibilità equivalente controtelaio
$[\theta_T]$ Innentemperatur des Rahmens
Temperatura interna del telaio

		A,B,C	D,E	F_{TI}	F_{TA}
[cm]	T	6,8	6,8	9,2	6,8
[W/mK]	λ_{eq}	0,04	0,04	0,04	0,08
[°C]	θ_T	+17,4	+16,2	+16,1	+15,1

[X] Laut UNI 11673-1
Secondo UNI 11673-1

[Y] Der Bauanschluss ist hinsichtlich Feuchte- und Schallschutz zu überprüfen.
Valutare il dettaglio da un punto di vista igrotermico e acustico.

M	SYMBOL SIMBOLO	BESCHREIBUNG DESCRIZIONE		[W/mK]
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▲ Allgemeine Angabe die vom Planer überprüft werden muss.
Indicazione generica che deve essere verificata dal progettista.

THE **FINAL ASSESSMENT OF LEARNING** CONSISTS IN A DISCUSSION OF THE COURSE TOPICS AND EVALUATION OF THE FINAL PROJECT DOCUMENTED BY A PRESENTATION AND GRAPHIC DRAWINGS PRODUCED BY THE STUDENT.

EACH **GROUP** (MAXIMUM 2 STUDENTS) WILL HAVE TO PREPARE A **PRESENTATION OF 10 MINUTES** ABOUT THE FINAL PROJECT AND PRINT THE REQUIRED **ARCHITECTURAL AND STRUCTURAL DRAWINGS**.

A DETAILED LIST OF THE REQUIRED DRAWINGS WILL BE PROVIDED DURING THE COURSE.

FOR THE EXAM DAY, EACH GROUP WILL HAVE TO BRING:
- HARD COPY OF THE REQUIRED DRAWINGS (ISO A1 SIZE, HORIZONTAL ORIENTATION);
- HARD COPY OF THE REDUCED DRAWINGS (ISO A3 SIZE, BOOK);
- UPLOAD THE DRAWINGS (PDF/JPG) AND BIM MODEL TO THE ELLY PLATFORM, TWO DAYS BEFORE THE EXAM.

MINIMUM HOUSING UNIT **REQUIREMENTS**:
- AT LEAST TWO DOUBLE ROOMS/AT LEAST ONE DOUBLE ROOM AND TWO SINGLE ROOMS;
- LIVING ROOM, DINING ROOM AND KITCHEN;
- AT LEAST ONE BATHROOM (NIGHT ZONE);
- AT LEAST ONE BATHROOM (DAY ZONE);
- LIBRARY/STUDY ROOM;
- ADDITIONAL ROOMS, SUCH AS LAUNDRY AND STORAGE ROOM;
- AT LEAST TWO PARKING SPACES (ONE IN THE GARAGE).

HEALTH AND SANITARY STANDARDS AND **BUILDING REGULATIONS** MUST BE SATISFIED (IN TERMS OF NATURAL LIGHTING, MINIMUM ROOM HEIGHTS, DIMENSION OF HABITABLE ROOMS, ETC.).

IT IS IMPORTANT TO STRESS THAT THIS EXERCISE IS FOR **EDUCATIONAL PURPOSES** ONLY. IN REAL WORKING LIFE, THE DESIGN PROCESS WOULD BE MORE COMPLEX AND WOULD REQUIRE DETAILED ANALYSIS OF THE REGULATORY REFERENCES.

THE PROJECT MUST BE MANAGED USING **BIM PLATFORM**.
INTEGRATION DRAWINGS WITH AUTOCAD (E.G. CONSTRUCTION DETAILS) ARE NOT ALLOWED.

THE FOLLOWING DRAWINGS ARE REQUIRED [A1 SIZE]:
- MASTER PLAN [SCALE 1:2000-1:500] AND SITE PLAN [SCALE 1:200/1:100];
- GROUND FLOOR PLAN, FIRST FLOOR PLAN, SECOND FLOOR PLAN [SCALE 1:50];
- TWO VERTICAL SECTIONS OF WHICH ONE MUST PASS THROUGH THE STAIR [SCALE 1:50];
- FOUR ELEVATIONS [SCALE 1:50];
- SCHEDULE OF DOORS AND WINDOWS [SCALE 1:20];
- SCHEDULE OF HORIZONTAL AND VERTICAL ELEMENTS [SCALE 1:20/1:10/1:5];
  PLAN AND SECTION DETAILS [SCALE 1:20/1:10/1:5];
- AT LEAST TWO EXTERNAL AND TWO INTERNAL VIEWS (DIGITAL RENDERINGS);
- ADDITIONAL **''COMPETITION SHEET''** IS ALSO REQUIRED [A1 SIZE].

DRAWINGS MUST BE COMPLETE WITH DIMENSIONS AND ANY OTHER REFERENCE USEFUL TO COMMUNICATE THE TECHNICAL CONSTRUCTIVE ASPECTS OF THE PROJECT, THE FORMAL AND MATERIAL SOLUTIONS ADOPTED, AND THE RELATIONSHIP OF THE ARCHITECTURE WITH THE URBAN CONTEXT.
SITE ANALYSIS AND FUNCTIONAL DIAGRAMS, KEY PLANS AND OTHER SIGNIFICANT REPRESENTATIONS ARE ALSO ALLOWED/MANDATORY. IN GENERAL, GRAPHIC REPRESENTATIONS SHOULD HAVE A COMPLETE DESCRIPTION AND SHOULD CONTAIN ALL THE NECESSARY INFORMATION (FOR EXAMPLE: NORTH, GRAPHIC SCALE, LEGEND, ETC.).

THE **TITLE BLOCK** WILL HAVE TO CONTAIN THE FOLLOWING INFORMATION (PROPERLY ORGANIZED):

UNIVERSITY OF PARMA
DEPARTMENT OF ENGINEERING AND ARCHITECTURE
SECOND-CYCLE DEGREE COURSE IN ARCHITECTURE AND CITY SUSTAINABILITY

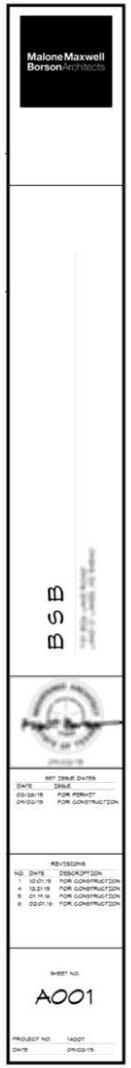
COURSE OF BUILDING INFORMATION MODELING
A.Y. 2022-2023, PROF. SANDRA MIKOLAJEWSKA

PROJECT TITLE
PROJECT DATA

STUDENT NAME
EXAM DATE 00/00/0000

SHEET TITLE
SHEET NUMBER

ADDITIONAL INFORMATION ARE ALSO ALLOWED.



1. WHAT DO YOU EXPECT FROM THIS COURSE?

2. WHY DID YOU CHOOSE THIS COURSE (IN ENGLISH AND NOT IN ITALIAN)?

3. IS THERE ANY SPECIFIC TOPIC YOU WOULD LIKE THIS COURSE TO COVER?

4. WHAT CAN YOU TELL ME ABOUT YOUR RELATIONSHIP WITH THE ENGLISH LANGUAGE? (I.E. MOTHER TONGUE, STUDY ABROAD EXPERIENCE, USE OF SOFTWARE IN NATIVE LANGUAGE, ETC.)

5. SINCE WHEN AND FOR HOW LONG HAVE YOU BEEN STUDYING ENGLISH?

6. WHICH SOFTWARE DO YOU USE (IN THE FIELD OF THREE-DIMENSIONAL MODELING, IMAGE PROCESSING AND RENDERING)?

7. WHAT IS YOUR LEVEL OF COMPETENCY IN USING THIS SOFTWARE (BASIC, INTERMEDIATE, ADVANCED)?

8. WHERE DID YOU GET YOUR BACHELOR'S DEGREE FROM?