Module Title	**Digital Tools & Methods I**			
Module Number	**MID C1**			
Module Responsibility	Prof. i.V. Hans Sachs			
Lecturer	Prof. i.V. Hans Sachs, Dipl.-Ing. David Lemberski, wiss. MA, Lehrbeauftragte			
Course of Study	Master of Integrated Architectural Design (MIAD)			
Status	Mandatory Module	**x**	Compulsory Module	
Semester	1			
Forms of Teaching	Lecture, Seminar, Workshops			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	30	Laboratory	
	Seminar	30	Workshop	
	Excursion		Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	none			
Goal of study / Competences	• Basic knowledge of the architectural theory discussion on the use of digital methods and tools in design and fabrication processes of the built environment. • Gaining experience in the experimental and interdisciplinary exploration of digital tools in the context of architectural planning, fabrication and building automation. • Basic knowledge about software applications in the area of professional image editing, generative and adaptive modeling processes and the use of realated software tools, such as Rhino + Grasshopper, Processing, Generative Clouds, VW Marionette, Revit (+Dynamo), Digital Project (Catia) etc. • Development of basic competences in programming and generative modeling based on visual and higher programming languages for designers (such as processing) • Project-oriented application of software in the fields of visualization and modeling and basic experience with software their interfaces.			

Contents of Study	• The lecture presents various computer-based design, development and fabrication processes in the field of building design and construction as well as industrial design • Various examples of digital design processes within the context of digital networking and modeling will be presented and explored on a methodological and a project-related level. • In the exercises, software applications from the fields of 3D Modeling' and the more advanced 'Generative Modeling' will possibly be applied within the context project modules of the study program. In addition potentials of the use of programming (scripting) in the industrial design and building design context will be exemplarily presented. • Interfaces of different software applications and computer-assisted manufacturing techniques from the above-mentioned areas and their application are presented and implemented in a project-oriented manner. Hereby the presented tools and methods are put into a theoretical and practical context using examples and scenarios. • In the exercises, links between design, development and production processes as well as the interfaces of physical and virtual objects and rooms are presented and exemplified.
Forms of Exam	Elaboration and Colloquium
Literature	• Beorkrem, C. (2012). *Material Strategies in Digital Fabrication,* Routledge • Jabi W., Johnson, B., Woodbury, R. (2013) *Parametric Design for Architecture*, Laurence King Publishing • Shiffman, D. (2015), *Learning Processing: A Beginner's Guide to Programming Images, Animation, and Interaction*, Morgan Kaufmann • Reas, C., & McWilliams, C. (2010). *Form+ code: In design, art, and architecture*. Princeton Architecturel Press • Jackson, P. (2011), *Folding Techniques for Designers: From Sheet to Form*, Laurence King Publishing • Bohnacker, H., Groß, B., Laub, J., Gross, B., Laub, J., & Lazzeroni, C. (2009). *Generative Gestaltung: entwerfen, programmieren, visualisieren*. C. Lazzeroni (Ed.). Mainz: Schmidt. • Reas, C., & Fry, B. (2007). *Processing: a programming handbook for visual designers and artists* (Vol. 6812). Mit Press. • Dunn, N. (2012), Digital Fabrication in Architecture, Laurence King Publish. • Menges, A., Ahlquist, S. (2011). *Computational Design Thinking: Computation Design Thinking*. John Wiley & Sons • Agkathidis A.,., (2012). *Computational Architecture: digital design tools and manufacturing techniques.* BIS Publishers • Hodson, R. (2014), *Ry's Git Tutorial*, RyPress • Terzidis, K. (2009). *Algorithms for visual design using the processing language*. John Wiley & Sons. • *Serres,B. (2014). Thumbelina: The Culture and Technology of Millennials.* Rowman & Littlefield International

Module Title	**Construction and Dimensioning**			
Module Number	**MID C2**			
Module Responsibility	Prof. Dipl.-Ing. Jens-Uwe Schulz			
Lecturer	Prof. Dipl.-Ing. Jens-Uwe Schulz			
Course of Study	Master of Integrated Design (MID)			
Status	Mandatory Module	**x**	Compulsory Module	
Semester	1			
Forms of Teaching	Lecture, Seminar			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	30	Laboratory	
	Seminar	30	Workshop	
	Excursion		Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	none			
Goal of study / Competences	• Deepen the basic knowledge about load bearing and deformation behavior of primary structures and constructions of buildings • Students should be able to independently develop and analyze complex primary constructions and special constructions within the scope of design tasks, as well as to be able to define requirements and interfaces with the planners • In addition, they should be able to formulate and apply assessment criteria for primary constructions, in particular with regard to the overall design concept. • Recognize and quantify the essential requirements of structural designs. • Approximate dimensioning of supporting structures			
Contents of Study	• The lecture provides an overview of the morphology of the primary and special constructions regarding mechanical, constructive, functional, material and design aspects. • Furthermore the basic principles of the analysis methods are mediated and assessment and assessment methods are discussed. • In the accompanying exercises, the content of the lecture will			

	be deepened by means of concrete models and calculation programs. • One-semester assignment, which is to be presented in the exam, is practiced independently
Forms of Exam	Elaboration and Colloquium
Literature	• Schulz, J.-U.: Construction and Dimensioning. Script • Arya, C.: Design of Structural Elements: Concrete, Steelwork, Masonry and Timber Designs to British Standards and Eurocodes. 3. Edition, CRC Press, 2009 • Braycott, T.; Bullman, P.: Structural Elements Design Manual. Working with Eurocodes. 2. Edition, Routledge, 2013 • Engel, H.: Tragsysteme/Structure Systems. 3. Aufl., Hatje Cantz, 2007 (deutsch/englisch) • Garrison, P.: Basic Structures. 3. Edition, Wiley Blackwell, 2016 • McKenzie, W. M. C.: Design of Structural Elements to Eurocodes. 2. Edition, Palgrave Macmillan, 2013 • Ochshorn, J.: Structural Elements for Architects and Builders: Design of Columns, Beams, and Tension Elements in Wood, Steel, and Reinforced Concrete. 2. Edition, Common Ground Publishing, 2015 • Schodek, D. L.; Brechthold, M.: Structures. 7. Edition, Pearson, 2014 • Watts, A.: Modern Construction Handbook. 4. Edition, Birkhäuser, 2016

Module Title	**Digital Tools and Methods II**			
Module Number	**MID C3**			
Module Responsibility	Prof. i.V. Hans Sachs, Prof. Dipl.-Ing. Jens-Uwe Schulz			
Lecturer	Prof. i.V. Hans Sachs, Prof. Dipl.-Ing. Jens-Uwe Schulz, wiss. Mitarbeiter und Lehrbeauftragte			
Course of Study	Master of Integrated Design (MID)			
Status	Mandatory Module	**x**	Compulsory Module	
Semester	2			
Forms of Teaching	Lecture, Seminar, Workshops			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	30	Laboratory	
	Seminar	15	Workshop	15
	Excursion		Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	Digital Tools and Methods I			
Goal of study / Competences	• The Capability to understand, setup and manage collaborative, interdisciplinary workflows related to generative and integrative building modelling processes. • The Competence to work in a Common Data Environment from design to construction based on the principles of Building Information Modeling (BIM) • Skills to operate with different AEC modelling and planning software applications and understanding of different CAD-based data standards and their administration through universal data interfaces.			
Contents of Study	• Lectures on theoretical and international aspects of BIM standards (ISO16739, ÖNorm, Pas1192, DIN91400, VDI 2552, etc.) with praxis related applications and tendencies of computerbased planning and fabrication processes. • The introduction and discussion of a representative case-study for an interdisciplinary workflow explaining native vs. standardized file formats, external / open data sources.			

	• Individual software applications to store information in their native formats, imposing challenges in the AEC industry to make information available to project stakeholders, • The presentation and application of digital design methodologies, software systems, information and communication technologies to address effective exchange of data between software applications such as middleware software, exchange file formats developed by individual proprietary software vendors such as DXF (Data eXchange Format), standards and open-specification data models like XML (eXtensible Markup Language), IFC (Industry Foundation Classes), Web Services, ICT, project model servers, and semantic Web applications (i.e. Flux.io etc.)
Forms of Exam	Elaboration and Colloquium
Literature	• Breit, Manfred (2010). Digital Simulation in Lean Project Development. • Breit, Manfred (2010). Process oriented model based information exchange between architecture and fabrication in early project phases. • Crotty, R. (2013). The impact of building information modelling: transforming construction. Routledge. • Deutsch, R. (2011). BIM and integrated design: strategies for architectural practice. John Wiley & Sons. • Eastman, C., Eastman, C. M., Teicholz, P., & Sacks, R. (2011). BIM handbook: A guide to building information modeling for owners, managers, designers, engineers and contractors. John Wiley & Sons. • Ernst & Sohn Special (2014). BIM – Bulding Information Modeling, • Graham, Peter C. (2012). Optimization in Architecture through a Synthesis of Design, Analysis and Fabrication, • Günthner, W. A., & Borrmann, A. (Eds.). (2011). Digitale Baustelle-innovativer Planen, effizienter Ausführen: Werkzeuge und Methoden für das Bauen im 21. Jahrhundert. Springer-Verlag • Hardin, B., & McCool, D. (2015). BIM and construction management: proven tools, methods, and workflows. John Wiley & Sons. • Holzer, D. (2015). The BIM Manager's Handbook, Part 1: Best Practice BIM. John Wiley & Sons. • Industrieallianz für Interoperabilität e.V. (2008). Building Smart Anwenderhandbuch, Datenaustausch BIM/IFC. • ISO 16739 Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries, first edition 2013-04-01 • Junge, R. (Ed.). (2012). CAAD Futures 1997: Proceedings of the 7th International Conference on Computer Aided Architectural Design Futures Held in Munich, Germany, 4–6 August 1997. Springer Science & Business Media. • Leicht, Robert (2007). Moving toward an intelligent shop modeling process. • Race, S. (2012). BIM demystified. Riba Publishing. • Reinhardt, Jan (2015). Level of Development Specification

Module Title	**Theory Research and Scientific Methods**			
Module Number	**MID C4**			
Module Responsibility	Prof. Michel Melenhorst			
Lecturer	Prof. Michel Melenhorst and others			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module	**x**	Compulsory Module	
Use for MIAR	Mandatory Module		Compulsory Module	**x**
Use for MNBB	Mandatory Module		Compulsory Module	**x**
Use for MLD	Mandatory Module		Compulsory Module	**x**
Semester	1			
Forms of Teaching	Lecture, Seminar,Workshop Copies and papers on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	1	Other	3
Workload(h)	Lecture	12	Laboratory	
	Seminar	30	Workshop	18
	Excursion		Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	-			
Goal of study / Competences	• to gain knowledge on different design and research methodologies and attitudes, in- and outside the academic realm • Working with and practising different systematic research and design processes for architecture related and supportive fields. • Train skills in scientific working and scientific writing			
Contents of Study	Lectures: • Overview of positions in research and design. • Scientific working and writing • Examples of possibilities for research and scientific work in and outside the academic world.			

	Seminars: • Analysing different research forms and - formats. • Research by Design, and Design by Research: learning to work with different formats in combinations between design and research. • Workshops on information management, citation formats and scientific writing, the skills learned in the workshops are used to write an abstract for a conference contribution. This module prepares for MID C5 Conference
Forms of Exam	Mid-term and final presentation, Scientific paper with colloquium Documentation with colloquium (1,0)
Literature	• de Jong, T.M. van der Voordt, D.J.M. (2002). Ways to study and research - urban, architectural and technological design. Delft: Delft University Press • Design Research Now Essays and Selected Projects (2007). online resource Bib HS-OWL. • Friedman, K. (1997/2015). Design Science and Design Edication, In: The Challenge of complexity. http://www.academia.edu/250736/Friedman._1997._Design_Science_and_Design_Education • Hauberg, Jørgen (2011). Research by Design – a research strategy. In: Architecture & Education Journal (5) http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0ahUKEwjK_qC6yerKAhWBeg8KHS2QBScQFgg4MAM&url=http%3A%2F%2Frevistas.ulusofona.pt%2Findex.php%2Frevlae%2Farticle%2Fdownload%2F2680%2F2043&usg=AFQjCNEWuMV6xqyxiMjP4zIBiZ-zfU1ITg&sig2=H69MtUJshtsNL7YzqZYnzg • Müler Publishers (ISBN 978-3-03778-190-6. • Ju , Wendy; Neeley, W Lawrence; Leifer, Larry (2000). Design, Design, and Design. An Overview Of Stanford's Center For Design Research. http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.83.1179 (HS-OWL -> DigiBib) • Kopec, David Allen, et. al. (2011). Evidence-Based Design: A Process for Research and Writing. Prentice Hall: Pearson. • Laurel, Brenda (2004). Design Research: Methods and Perspectives. Boston: Mit University Press. • Sevaldson, Birger (2010). Discussions & Movements in Design Research. https://journals.hioa.no/index.php/formakademisk/article/view/137 (HS-OWL -> DigiBib) • http://www.designsciencejournal.org/reviewers/

Module Title	**Conference and Communication**			
Module Number	**MID C5**			
Module Responsibility	Prof. Dr.-Ing. Uta Pottgiesser			
Lecturer	Prof. Dr.-Ing. Uta Pottgiesser			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module	**x**	Compulsory Module	
Semester	3			
Forms of Teaching	Seminar, Literature on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	1			
Hours per Week (SWS)	Lecture		Other	
Workload(h)	Lecture		Laboratory	
	Seminar	16	Workshop	24
	Excursion		Work Experience	
	Self Study	140	Exam Preparation	
Workload total (h)	180			
Credits	6			
Prerequisites	Module C4 Theory and Scientific Methods			
Goal of study / Competences	• The students should apply the knowledge of Module C4 to produce a scientific conference paper or poster or in an architectural competition, • The paper or poster should reflect the “State of the art” and new developments of research, design and technology in the field of architecture, • The students are requested to apply for the call for papers in a national or international conference of their choice or offered from the universities network (e.g. Docomomo International, Future Envelope, Facade200x, ICBEST, PLEA, SIGRADI…) and to present their papers or posters or contribution, • Categorisation, structuring and documentation of the multitude of information and results from previous research and projects.			
Contents of Study	• The module provides an up-to-date overview of the current national and international research activities and scientific conferences in the field of architecture and its protagonists,			

	supplementing the Core and Specialised Modules, • The module deals with different and specific themes and topics that are relevant for the three concentrations (Architectural, Facade and Computational Design), • Content may also be related to important aspects of legislation and policy or to the design and building and process.
Forms of Exam	Elaboration (scientific paper or poster) with Colloquium
Literature	• Bendix, Manuela (2008). Wissenschaftliche Arbeiten typografisch gestalten. Berlin, Heidelberg: Springer-Verlag. Campuszugriff: http://dx.doi.org/10.1007/978-3-540-73392-8 • Flick, U. u.a. (Hrsg.) (1991): Handbuch Qualitative Sozialforschung. München. • Gockel, Tilo (2010). Form der wissenschaftlichen Ausarbeitung. Studienarbeit, Diplomarbeit, Dissertation, Konferenzbeitrag. Berlin, Heidelberg: Springer-Verlag. Campuszugriff: http://dx.doi.org/10.1007/978-3-642-13907-9 • Singh, Yogesh Kumar (2014). Fundamental of Research Methodology and Statistics. New Dehli: New Age International. • Steffen, Dagmar (2014). New experimentalism in design research. Characteristics and interferences of experiments in science, the arts, and in design research. In: Artifact III (2), pp 1.1-1.16. • Theisen, M. R. (1997): Wissenschaftliches Arbeiten: Technik - Methodik - Form. 8. Akt. und erw. Auflage, München. • Wachten, Kunibert; Nadrowski, Steffen (2004). Wissen-schaftliches Arbeiten für Studierende der Stadtplanung und Architektur (Entwurf). Skript. Aachen: RWTH Aachen • Papers on digital media (Internet / e-learning), • Proceedings of visited and other conferences and papers from research platforms • weitere deutsch- und englischsprachige Quellen zu Research by Design, Design by Research (see Module C4 Theory and Scientific Methods)

Module Title	**Advanced Design**			
Module Number	**MID E1**			
Module Responsibility	Prof. MA Jasper Jochimsem			
Lecturer	Prof. MA Jasper Jochimsem, Prof. i.V. MA Hans Sachs, Dipl.-Ing. David Lemberski			
Course of Study	Master Integrated Architectural Design (M-IAD)			
Status	Mandatory Module		Compulsory Module	**x**
Use for MIAR	Mandatory Module		Compulsory Module	**x**
Use for MNBB	Mandatory Module		Compulsory Module	
Use for MLD	Mandatory Module		Compulsory Module	**x**
Semester	3			
Forms of Teaching	Lecture, Seminar, workshops, hands-on training; Black-board, beamer-presentation; Literature on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	1	Other	3
Workload(h)	Lecture	15	Laboratory	
	Seminar	30	Workshop	10
	Excursion	10	Work Experience	
	Self Study	100	Exam Preparation	15
Workload total (h)	180			
Credits	6			
Prerequisites	Projects and modules semester 1 + 2			
Goal of study / Competences	• individual specialisation with a focus to design aspects of architectural design related to transdisciplinary applied or theoretic themes, • deepen the knowledge with a specific focus to praxis relevant problems in cooperation with cooperating industry partners, • gain deeper knowledge with a specific focus to theoretical design aspect in the context of research, • overarching issues within the discipline of design, the students will deal with fundamental questions of design, challenge current approaches and perspectives, • critically examine the importance of designers in a social			

	context and related to innovation, social impact, and sustainability • suitable scientific documentation of the results.
Contents of Study	• Lectures and seminars introducing to specific design aspects, • Introduction and discussion of representative case-studies, • Focus in one field such as design research, design criticism, and design • theory • excursion and visit of case-studies to see the practical aspects.
Forms of Exam	Elaboration and Colloquium (Studienarbeit mit Kolloquium)
Literature	• Papers on digital media (CD-ROM / Internet / e-learning) • Company's records and documents • Further literature depending on the specific focus

Module Title	**Vertiefung Konstruktion / Advanced Construction**			
Module Number	**MID E2**			
Module Responsibility	Prof. Dr.-Ing. Uta Pottgiesser, Prof. Dipl.-Ing. i. V. Norbert Hanenberg			
Lecturer	Prof. Dr.-Ing. Uta Pottgiesser, Prof. Dipl.-Ing. . i. V Norbert Hanenberg, Prof. Dipl.-Ing. Lux, Prof.in Dr. Ing. Schwickert, Prof. Dipl.-Ing. Schulz			
Course of Study	Master Integrated Architectural Design (MIAD)			
Status	Mandatory Module		Compulsory Module	**x**
Use for MIAR	Mandatory Module		Compulsory Module	
Use for MNBB	Mandatory Module		Compulsory Module	**x**
Use for MLD	Mandatory Module		Compulsory Module	
Semester	3			
Forms of Teaching	Lecture, Seminar, workshops, hands-on training; Black-board, beamer-presentation; Literature on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	1	Other	3
Workload(h)	Lecture	15	Laboratory	
	Seminar	30	Workshop	10
	Excursion	10	Work Experience	
	Self Study	100	Exam Preparation	15
Workload total (h)	180			
Credits	6			
Prerequisites	Keine			
Goal of study / Competences	• Special areas of construction and finishings • individual specialisation with a focus to constructional aspects of architectural design related to transdisciplinary applied or theoretic themes, • deepen the knowledge with a specific focus to praxis relevant problems in cooperation with cooperating industry partners, • deepen knowledge with a specific focus to sustainable construction aspect in the context of research • suitable scientific documentation of the results.			

Contents of Study	• Lectures and seminars introducing to specific construction areas and topics, such as: sustainability in construction, joining and rejoining, LCA, fabrication methods and logistics, membrane constructions and free forms, glass constructions, new material technologies, fire protection. • excursion and visit of case-studies to see the practical aspects.
Forms of Exam	Presentation and Colloquium (Präsentation mit Kolloquium)
Literature	• Papers on digital media (CD-ROM / Internet / e-learning) • Company's records and documents • Further literature depending on the specific focus

Module Title	**Advanced Programming**			
Module Number	**MID E3**			
Module Responsibility	Prof. Dipl.-Ing. Jens-Uwe Schulz			
Lecturer	Prof. Dipl.-Ing. Jens-Uwe Schulz, M.Eng. Patrick Günther			
Course of Study	Master Integrated Architectural Design (MIAD)			
Status	Mandatory Module		Compulsory Module	**x**
Use for MIAR	Mandatory Module		Compulsory Module	
Use for MNBB	Mandatory Module		Compulsory Module	**x**
Use for MLD	Mandatory Module		Compulsory Module	
Semester	3			
Forms of Teaching	Lecture, Seminar, workshops, hands-on training; Black-board, beamer-presentation; Literature on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	1	Other	3
Workload(h)	Lecture	15	Laboratory	
	Seminar	30	Workshop	10
	Excursion	10	Work Experience	
	Self Study	100	Exam Preparation	15
Workload total (h)	180			
Credits	6			
Prerequisites	Projects and modules semester 1 + 2			
Goal of study / Competences	• individual specialisation with a focus to computational aspects of architectural design related to applied or theoretic themes, • deepen knowledge with a specific focus to praxis relevant problems in cooperation with cooperating industry partners, • deeper knowledge with a specific focus to theoretical computational aspects in the context of research, • suitable scientific documentation of the results.			
Contents of Study	• Lectures and seminars introducing to specific aspects of software and programming, • Introduction and discussion of representative case-studies, • possible topics: specific simulation such as fire and smoke exhaust,...			

Forms of Exam	Elaboration and Colloquium (Studienarbeit mit Kolloquium)
Literature	• Papers on digital media (CD-ROM / Internet / e-learning) • Company's records and documents • Further literature depending on the specific focus

Modultitel	**Vertiefung Theorie / Advanced Theory**			
Modulnummer	**MID E4**			
Modulverantwortliche/r	Prof. Dr. phil. A. K. Vetter			
Lehrende	Prof. Dr. phil. A. K. Vetter			
Studiengang	Master Integrated Architectural Design (MIAD)			
Status	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MIAR	Pflichtmodul		Wahlpflichtmodul	
Verwendung MNBB	Pflichtmodul		Wahlpflichtmodul	
Verwendung MLD	Pflichtmodul		Wahlpflichtmodul	
Regelsemester	3			
Lehrformen				
Lehrsprache	Deutsch / Englisch			
Umfang (SWS)	4			
Umfang (SWS)	Vorlesung		andere	4
Workload (h)	Vorlesung		Übung	60
	Seminar		Workshop	
	Exkursion		Praktikum	
	Selbststudium	102	Prüfungsvorbereitung	18
Workload gesamt (h)	180			
Credits	6			
Voraussetzungen	keine			
Lernziele und Kompetenzen	• Auf Grundlage eines vertieften Verständnisses kunstgeschichtlicher und wissenschaftlicher Betrachtungsweisen wird die Fähigkeit zur Reflektion weiter geschult. Hierfür notwendig ist eine sichere Position innerhalb des gestalterischen Denkens – insofern wird dieses Fach für den Master angeboten. • Kontakt mit der Bedeutung kreativ-strategischen Analysierens, Reflektierens und Konzipierens			
Inhalt	• In diesem Modul gilt es Entwürfe zu begreifen, die Ordnung und Struktur nur noch im Sinne von Proximitäten und Distanzen, Flüssen und Strömen kennen. Sinn dieses Labors ist es Themen aus theoretischer und praktischer Sicht zu erschließen sowie spezielle Zukunftsszenarien aus			

	• theoretischer und praktischer Sicht unter Einbringung aktuellster Methodik zu entwickeln. • Das Modul wird in einer inhaltlich dicht strukturierten Blockveranstaltung ggf. je nach Themenbereich auch an anderen Orten stattfinden. • Eine Exkursion ist ebenso Bestandteil wie die Abfassung kurzer, nach akademischen Bedingungen verfasster theoretischer Exposés.
Prüfungsform	Mündliche Prüfug
Literatur	

Modultitel	**Vertiefung Visualisierung / Advanced Visualisation**			
Modulnummer	**MID E5**			
Modulverantwortliche/r	Prof. Dipl.-Ing. Ernst Thevis			
Lehrende	Prof. Dipl. Ing. i.v. H. Sachs, Prof. K.-M. Rennertz, Prof. Dipl.-Ing. E. Thevis, Prof. Dipl.-Ing. Th. Kesseler, Dipl.-Des. D. Schelpmeier, Prof. J. Kiefel M.A			
Studiengang	Master Integrated Architectural Design (MIAD)			
Status	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MIAR	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MNBB	Pflichtmodul		Wahlpflichtmodul	
Verwendung MLD	Pflichtmodul		Wahlpflichtmodul	**x**
Regelsemester	3			
Lehrformen				
Lehrsprache	Deutsch / Englisch			
Umfang (SWS)	4			
Umfang (SWS)	Vorlesung	1	andere	3
Workload (h)	Vorlesung	12	Übung	48
	Seminar		Workshop	
	Exkursion		Praktikum	
	Selbststudium	102	Prüfungsvorbereitung	18
Workload gesamt (h)	180			
Credits	6			
Voraussetzungen	keine			
Lernziele und Kompetenzen	• Kennen Lernen und anwenden Lernen historischer und aktueller Darstellungsmethoden, -techniken und -medien aus den Bereichen von Grafik-Design, Visualisierung, Animation, Fotografie, Video und Film im Umkreis der Bildenden Künste; • Befähigung zur eigenen künstlerischen Arbeit			
Inhalt	• Neue Entwicklungen in Typografie und Layout; • Schrift als künstlerisches Ausdrucksmittel; • Geschichte und Zukunft von Buch, Katalog und Plakat; Text und Hypertext; • Fotokünstlerische Experimente;			

	• Theorie und Praxis der Film- und Video-Kunst; • Erstellung fotorealistischer und/oder künstlerisch/atmosphärischer Visualisierungen und Animationen mit Hilfe digitaler Darstellungswerkzeuge, • Hybride Darstellungstechniken im Grenzbereich zwischen analogen und digitalen Medien
Prüfungsform	Präsentation und Kolloquium
Literatur	• Papers on digital media (CD-ROM / Internet / e-learning) • Further literature depending on the specific focus

Modultitel	**Bautechnisches Englisch II**			
Modulnummer	**MID E6**			
Modulverantwortliche/r	Dr. (USA) Andrea Koßlowski-Klee			
Lehrende	Dr. (USA) Andrea Koßlowski-Klee			
Studiengang	Master Integrated Architectural Design (MIAD)			
Status	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MIAR	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MNBB	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MLD	Pflichtmodul		Wahlpflichtmodul	**x**
Regelsemester	3			
Lehrformen	Seminar			
Lehrsprache	Englisch			
Umfang (SWS)	4			
Umfang (SWS)	Seminar	1	andere	3
Workload (h)	Vorlesung	12	Übung	
	Seminar	48	Workshop	
	Exkursion		Praktikum	
	Selbststudium	102	Prüfungsvorbereitung	18
Workload gesamt (h)	**180**			
Credits	6			
Voraussetzungen	Empfehlung: Bautechnisches Englisch I			
Lernziele und Kompetenzen	• Der Kurs vermittelt und trainiert die fremdsprachliche Kommunikations- und Handlungsfähigkeit im Bereich des Bauwesens, der Architektur und Innenarchitektur anhand konkreter Praxisbeispiele aus dem Arbeitsleben von Architekten, Innenarchitekten und Bauingenieuren. • Methodenkompetenz: - Problemerkennungs- und Problemlösungsfähigkeit - Strukturierungs-, Synthese- und Analysefähigkeiten - Medienkompetenz • Sozial/Selbstkompetenz: - Verständliche Darstellungsfähigkeit - Kooperationsfähigkeit • Fachkompetenz:			

	- Kann komplexe Sachverhalte klar und detailliert beschreiben und darstellen und dabei untergeordnete Themen integrieren, bestimmte Punkte genauer ausführen und alles mit einem angemessenen Schluss abrunden. - Kann klare, gut strukturierte Texte zu komplexen Themen verfassen und dabei die entscheidenden Punkte hervorheben, Standpunkte ausführlich darstellen und durch Unterpunkte oder geeignete Beispiele oder Begründungen stützen und den Text durch einen angemessenen Schluss abrunden.
Inhalt	• Vertiefung der Grundlagen aus Bautechnisches Englisch I • Bearbeitung von Original-Fallstudien aus dem Bereich des Baumanagements, der Architektur und Innenarchitektur unter fachsprachlichen Gesichtspunkten mit dem Ziel der sicheren Anwendung der baubezogenen Fachsprache in realitätsnahen und aufgabenbezogenen Rollenspielen, bei Präsentationen und im Schriftwechsel (sicheres und überzeugendes Präsentieren von aktuellen Bauprojekten, erfolgreiches Verhandeln, gezieltes Moderieren in der Bauindustrie bzw. im Projektmanagement etc.) Materialeinsatz z. T. in Kooperation mit einer Partnerhochschule. • Integration von Gastvorträgen ausländischer Partner / Beteiligung ausländischer Studierender von Partnerhochschulen an Projektarbeiten. Herausarbeitung berufsrelevanter kultureller Unterschiede im Baufach. Fachbezogener Sprachkurs, kein Fachkurs. Fachliches Wissen wird vorausgesetzt.
Prüfungsform	Klausur

Literatur	• Heidenreich, Sharon (2014). Englisch für Architekten und Bauingenieure – English for Architects and Civil Engineers. Vieweg und Teubner • Ibbotson, Mark (2009.). Professional English in Use: Engineering. Cambridge University Press • Gelbrich, Uli (2011.). Fachwörterbuch Bauwesen. Langenscheidt • Cumming, James. Architecture and Building Construction. Longman. • Killer, W.K. Bautechnisches Englisch im Bild / Illustrated Technical German for Builders. Bauverlag. • Powell, Mark (2011). Presenting in English. Heinle • Ridderstrale, Jonas and Kjell Nordström. Funky Business Forever: How to Enjoy Capitalism. FT Prentice Hall. • Fisher, R. and W. Ury (2012). Getting to Yes: Negotiating an Agreement Without Giving in: The Secret to Successful Negotiation. Random House • Fisher, Roger and Daniel Shapiro (2006.). Beyond Reason: Using Emotions as You Negotiate. Penguin Books, • Lewicki, Roy J., Bruce Barry and David M. Saunders (2007). Negotiation: Readings, Exercises and Cases. McGraw-Hill • Online-Kursmaterial für Business English von digital publishing (spexx Campus Language Training) zu den Themen Presenting, Telephoning, Meetings, Negotiating. • Print- und Videomaterialsammlung mit aktuellen Beiträgen und relevanten Übungen zum Thema

Modultitel	**Existenzgründung_Berufseinstieg**			
Modulnummer	**MID E7**			
Verantwortlich	Prof. Oliver Hall,			
Lehrende	Prof. Oliver Hall, Prof. Dr. Doris Ternes			
Studiengang	Master Integrated Architectural Design (MIAD)			
Status	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MIAR	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MNBB	Pflichtmodul		Wahlpflichtmodul	**x**
Verwendung MLD	Pflichtmodul		Wahlpflichtmodul	
Regelsemester	3			
Lehrformen				
Lehrsprache	Deutsch/ Englisch			
Umfang (SWS)	4			
Umfang (SWS)	Vorlesung	1	andere	3
Workload (h)	Vorlesung	15	Übung	45
	Seminar		Workshop	
	Exkursion	10	Praktikum	
	Selbststudium	80	Prüfungsvorbereitung	30
Workload gesamt (h)	180			
Credits	6			
Voraussetzungen	keine			
Lernziele und Kompetenzen	▪ Kennenlernen der Anforderungen an professionelle Bewerbungsunterlagen und -situationen ▪ Entwickeln und Reflektieren eines persönlichen Stils in der schriftlichen und mündlichen Selbstpräsentation ▪ Bedingungen und Anforderungen von Versorgungswerk und Architektenkammer kennen ▪ Unterschiedliche Finanzierungsmöglichkeiten und -formen beim Einstieg in die Selbständigkeit kennen ▪ Wahl der Rechtsform und deren Unterschiede in der Gründung und Besteuerung verstehen ▪ Kenntnisse zur Erstellung eines Businessplans			

Inhalt	▪ Bewerbungsunterlagen zielgruppenorientiert und vollständig erstellen ▪ Mappen-Workshop zur Darstellung eigener Arbeiten und Projekte ▪ Unterschiede zwischen Anstellung vs. Selbstständigkeit ▪ Besuch der Architektenkammer/ Versorgungswerk ▪ Entwicklung eines Businessplans ▪ wechselnde aktuelle Themen der Existenzgründung (Gründer-Cafe)
Prüfungsform	Studienarbeit mit Präsentation
Literatur	▪ Starter Mappe der AKNW ▪ Architekt/in werden - 13 FAQs für Studierende und Absolventen, AKNW ▪ Talis – Berufsstart Architekten Ingenieure, Jam Verlag ▪ ▪ Fröhlich, Burkhard; Schulenberg, Sonja (2003). Architekturstudium- und dann? Basel: Birkhäuser Verlag.

Module Title	**Facade Design and Construction**			
Module Number	**MID P4**			
Module Responsibility	Prof. Dr.-Ing. Uta Pottgiesser			
Lecturer	Prof. Dr.-Ing. Uta Pottgiesser, Prof. Dr.-Ing. Winfried Heusler, wiss. Mitarbeiter, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module FD	**x**	Compulsory Module	
Semester	1			
Forms of Teaching	Design Studio, Lectures, seminar, studio and desk crits; Literature on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	5			
Hours per Week (SWS)	Lecture	1	Other	4
Workload(h)	Lecture	15	Laboratory	
	Seminar	20	Workshop	25
	Excursion		Work Experience	
	Self-Study	270	Exam Preparation	30
Workload total (h)	360			
Credits	12			
Prerequisites	None			
Goal of study and Competences	• preparation for facade consultant´s or engineer's work: supporting the architectural concept making and decision finding, communication of relevant content (construction, structure materials, building physics, building services) related to the architectural concept and its relation to inner and outer space. • gain basic knowledge of developing facade principles while considering different conditions governing location depending on the given task • discuss, evaluate and support the development of different solutions for challenging facade constructions in an overall design approach for a case-study building in different climatic regions. • applying the knowledge in concept and construction drawings for the given project (scale 1:100 to 1:50) • presentation and discussion of the results in the plenum			

Contents of Study	• Lectures on specific existing facade principles and examples, typology of windows and facades and their construction principles, manufacturing and process of production line, assembly on-site (on-site tolerances, just in time handling, problems according to other trades, assembling etc.), • analysing specific facade details through hands-on assembly • Introduction and discussion of a representative case-study for the main project design, • Methods of presentation, structuring and organizing of content to prepare an adequate project description
Forms of Exam	Mid-term and final presentation, Elaboration with presentation and colloquium
Literature	• Scripts, company's records and documents at the Elearning platform • Best, R.; de Valence, G. Design and Construction - Building in Value. New York: Elsevier, 2002 • Compagno, Andrea (2002). Intelligent Glass Facades. Berlin: Birkhäuser • Cremers Jan et al (2015). Atlas Gebäudeöffnungen. München. Detail Verlag • Hauschild, Moritz (2010). Digitale Prozesse. München: Detail Praxis • Hausladen, Gerhard et al (2006). Clima Skin. München: Callwey Verlag. • Herzog, Thomas et al (2005). Facade Construction Manual. Basel: Birkhäuser Verlag. • Heusler, Winfried (2013). Building Envelopes for the 21st Century; Munich: Institut für Internationale Architektur-Dokumentation, • Hudson, Roland (2010,). Strategies for parametric design in architecture. Bath: PhD Thesis, • Knaack, Ulrich; Klein, Tilmann; Bilow, Marcel (2012). Principles of Construction - Facades. Basel: Birkhäuser Verlag. • Block, P., Knippers, J., Mitra, N.J., Wang, W. (Eds.) (2014). Advances in Architectural Geometry 2014, Wien: Springer • Oesterle, Eberhard et al (2001). Double-Skin Facades. Prestel. • Pottgiesser, Uta (2004). Fassadenschichtungen Glas. Berlin: Bauwerk Verlag, Berlin. • Graham, Peter C. (2012,). The Parametric Façade. Waterloo: PhD Thesis. • Vollers, Karel (2001). Twist&Build, creating non-orthogonal architecture. Rotterdam: 010 Publishers.

Module Title	**Integrated Building Façade Design**			
Module Number	**MID P4**			
Module Responsibility	Prof. Dr.-Ing. Uta Pottgiesser			
Lecturer	Prof. Dr.-Ing. Uta Pottgiesser, Prof. Dr.-Ing. Winfried Heusler wiss. Mitarbeiter, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module FD	x	Compulsory Module	
Use for MIAR	Mandatory Module		Compulsory Module	
Use for MNBB	Mandatory Module		Compulsory Module	
Use for MLD	Mandatory Module		Compulsory Module	
Semester	1			
Forms of Teaching	Integrated project with lectures, seminar and desk crits			
Language of Teaching	English			
Hours per Week (SWS)	5			
Hours per Week (SWS)	Lecture	1	Other	4
Workload(h)	Lecture	15	Laboratory	
	Seminar		Workshop	30
	Excursion	15	Work Experience	
	Self Study	270	Exam Preparation	30
Workload total (h)	360			
Credits	12			
Prerequisites	Modules of Semester 1			
Goals of study and Competences / general	• The project aims at exemplifying an integrative, methodical and at the same time individual approach to the design and engineering process. • A reflected interaction with the environment and responsible use of resources as well as consideration of the future development of society and technology are encouraged in the process. • The ability to present the project conception orally and on paper in a clear and appropriate way as well as critical reflection			

	of what has been achieved are important goals of the courseUnderstanding the development of building envelopes related to cultural and climatic conditions and in history and as part of the architectural design process • Understanding the complexity of buildings envelopes and facades related to functions, systems, materials and production • Evaluating the conceptual and technical advantages and disadvantages of different façade systems based on engineering methods • In the ensuing engineering process, specific relevant parameters and their potentially conflicting consequences are investigated in detail to support the architectural design decisions
Content of Study / general	• The project is the focal point of the second semester. It centers on supporting the design of a building serving a variety of functions set in a specific urban location. • Individual presentations on selected topics are held in the course of the seminar. • Materials and details and specific calculations are considered in relevant number. Models and simulations are required. • Variant discussion of façade solutions at various stages of an architectural project development. • In-depth design and engineering of the facade with special emphasis to the construction process in a scale up to 1:50
Forms of Exam	Mid-term and final presentation, Elaboration with presentation and colloquium
Literature	• Heusler, Winfried (2013). Building Envelopes for the 21st Century; Munich: Institut für Internationale Architektur-Dokumentation, • Herzog, Thomas et al (2005). Facade Construction Manual. Basel: Birkhäuser Verlag. • Knaack, Ulrich; Klein, Tilmann; Bilow, Marcel (2012). Principles of Construction - Facades. Basel: Birkhäuser Verlag.

Module Title	**Contextual Façade Design**			
Module Number	**MID P6**			
Module Responsibility	Prof. Dr.-Ing. Winfried Heusler,			
Lecturer	Prof. Dr.-Ing. Winfried Heusler, Prof. Dr.-Ing. Uta Pottgiesser, wiss. Mitarbeiter, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module FD	x	Compulsory Module	
Semester	3			
Forms of Teaching	Project with lectures, seminar, studio and desk crits			
Language of Teaching	English			
Hours per Week (SWS)	Lecture	1	Other	4
Workload(h)	Lecture	15	Laboratory	60
	Seminar		Workshop	15
	Excursion	30	Work Experience	
	Self-Study	200	Exam (Preparation)	40
Workload total (h)	360			
Credits	12			
Prerequisites	Project of 1. and 2. semester completed			
Goals of study and Competences / general	• The ability to analyse architectonic, cultural and societal coherences in the light of sustainable re-use of historical contexts. • The ability to understand and support the development of individual concepts for architectural projects in complicated or highly complicated contexts, using the theoretical knowledge and skills practiced in the specialised modules. • The ability to analyse judge and assess different contextual influences and situations to the benefit of a project. • A profound understanding of the nature of structural, architectural and functional systems in existing buildings. • The ability to present the conception of the project, both orally and on paper in a clear and appropriate way as well as critical reflection of what has been achieved • The students will be qualified to develop independently strategies for learning and research.			

	• Through consultations between the concentrations, students will learn to work in office like situations (laboratory) and how to benefit from the resulting interdisciplinary cross fertilisation. In the teamwork assignments within the overall project, the student will develop conflict management and chair skills. • The student should proof the ability to successfully support the development of a range of steps from analysis to understand a design concept for an architectural assignment. • A basic understanding of the influence of context and heritage aspects and integration into the façade design • Developing specific façade solutions in interaction with the architectural design by applying engineering or qualitative methods to improve the design concept related to facades in refurbishment of building stock
Contents of Study	• The project is the focal point of the third semester. It centers on a building design in a historical context (Reuse / Extension / New). Methods for analysing the building fabric and its economical, technical and cultural assessments are integrated in the overall design process. • The documentation of the project shows the analysis as a basis for the design process. • Materials and details are considered in relevant scales • An accompanying lecture series will illustrate the effect of contextual influences of diverse scales and natures, on the design and design process of architectural projects, show the history and development systems and technologies, climate adapted building design and the history of architectural planning methods (hand drawing, CAAD, generative algorithms, BIM). • Mastering theory and façade applications in a complex contextual setting • In-depth engineering, calculation and construction of the facade with special emphasis to the functional requirements in the re-use design • The conception and application of construction and mounting techniques in re-use design, refurbishment in historic architectural context
Forms of Exam	Mid-term and final presentation
Literature / General	• Digital media and scripts at the E-learning platform • Bullen, P., Love, P. 2011, 'Factors influencing the adaptive re-use of buildings', Journal of Engineering, Design and Technology Vol. 9 No. 1, pp. 32–46 • Pfammatter, Ulrich (2014). Building for a Changing Culture and Climate. Berlin: Dom Publishers, Berlin. • Preservation Green Lab (2012). The Greenest Building: Quantifying the Environmental Value of Building Reuse

	• Rabun, J. Stanley and Kelso, Richard (2009). Building Evaluation for Adaptive Reuse and Preservation, Hoboken: John Wiley & Sons, Inc., • Heusler, Winfried (2013). Building Envelopes for the 21st Century; Munich: Institut für Internationale Architektur-Dokumentation, • Herzog, Thomas et al (2005). Facade Construction Manual. Basel: Birkhäuser Verlag. • Knaack, Ulrich; Klein, Tilmann; Bilow, Marcel (2012). Principles of Construction - Facades. Basel: Birkhäuser Verlag.

Module Title	**Computational Design**			
Module Number	**MID P5**			
Module Responsibility	Prof. i.V. Hans Sachs			
Lecturer	Prof. i.V. Hans Sachs, Dipl.-Ing. David Lemberski, wiss. Mitarbeiter, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module	x	Compulsory Module	
Semester	1			
Forms of Teaching	Design Studio with lectures, seminar and desk crits, literature on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	5			
Hours per Week (SWS)	Lecture	1	Other	4
Workload(h)	Lecture	15	Laboratory	
	Seminar	30	Workshop	30
	Excursion		Work Experience	
	Self Study	240	Exam Preparation	45
Workload total (h)	360			
Credits	12			
Prerequisites	None			
Goal of study and Competences	• Preparation for computational designer´s or consultant's work: support the concept making and decision finding of the architectural design, communication of relevant content (construction, structure, materials, building physics, building services) related to the architectural and computer driven processes that enable the ability to reach optimized solutions • Reception of specific knowledge and skills about integrative data driven building and façade design and integration of value engineering methods in computable algorithms • gain specific knowledge of application of concepts learnt in parallel modules on computational and building design trough automated processes (optimization, simulation, pro-gramming) • discuss, evaluate and support the development of different solutions for challenging automated processes in an overall			

	design approach for a case-study building • Application of the presented contents in design, visualisation and execution drawings for the given situation, • Presentation and discussion of the results in the plenum.
Contents of Study	• Overview of technological requirements and detail aspects, especially integration of digital processes into the design • Lectures on specific integration of management-tools including BIM, CAD-CAM, manufacturing and process of production line, assembly on-site (tolerances, just in time handling, problems according to other trades, assembling etc.) and on case-studies about successful integration of algorithmic approaches to reach optimized engineered buildings • Application of advanced, adaptive and generative 3D modelling and presentation tools (software) in architectural design and planning
Forms of Exam	Mid-term and final presentation, Elaboration with presentation and colloquium
Literature	• Agkathidis A., Schillig G., Hudert M., (2007). Form Defining Strategies, experimental architectural design. Wasmuth Ernst Verlag • Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I., & Angel, S. (1977). A Pattern Language: Towns, Buildings, Construction (Center for Environmental Structure). • Barthel, R., & Nerdinger, W. (2010). Wendepunkte im Bauen: von der seriellen zur digitalen Architektur; [anlässlich der Ausstellung... im Architekturmuseum der TU München in der Pinakothek der Moderne, 18. März bis 13. Juni 2010]. Detail, Inst. für Internat. Architekturdokumentation. • BIG – Bjarke Ingels Group (2015). BIG Hot to Cold: An Odyssey of Architectural Adaptation • Dunne, A., & Raby, F. (2013). Speculative everything: design, fiction, and social dreaming. MIT Press. • Menges, A., & Ahlquist, S. (2011). Computational Design Thinking: Computation Design Thinking. John Wiley & Sons • Menges, A. (2012). Material computation: Higher integration in morphogenetic design. Architectural Design, 82(2), 14-21. • Moussavi, F. (2009). The Function of Form. Kubo, M.; Ambrose, G.; Fortunato, B.; Ludwig, R.; Schricker, A. (eds.) Harvard Graduate School of Design/Actar, 2009 • Peters, T., & Peters, B. (2013). Inside Smartgeometry: expanding the architectural possibilities of computational design. John Wiley & Sons. • Oxman, R., & Oxman, R. (2010). New structuralism: design, engineering and architectural technologies. Architectural Design, 80(4), 14-23. • Oxman, R., & Oxman, R. (2014). Theories of the Digital in Architecture. Routledge. • Pottmann, H. (2010). Architectural geometry as design knowledge. Architectural Design, 80(4), 72-77

Module Title	**Integrated Computational Building Design**			
Module Number	**MID P8**			
Module Responsibility	Prof. i. V. Dipl.-Ing. Hans Sachs			
Lecturer	Prof. i. V. Dipl.-Ing. Hans Sachs wiss. Mitarbeiter, Lehrbeauftragte			
Course of Study	Master Integrated Design (MIAD)			
Status	Mandatory Module	x	Compulsory Module	
Semester	1			
Forms of Teaching	Integrated project with lectures, seminar and desk crits			
Language of Teaching	English			
Hours per Week (SWS)	5			
Hours per Week (SWS)	Lecture	1	Other	4
Workload(h)	Lecture	15	Laboratory	
	Seminar		Workshop	30
	Excursion	15	Work Experience	
	Self Study	270	Exam Preparation	30
Workload total (h)	360			
Credits	12			
Prerequisites	Modules of Semester 1			
Goals of study and Competences	• The project aims at exemplifying an integrative, methodical and at the same time individual approach to the design and engineering process. • A reflected interaction with the environment and responsible use of resources as well as consideration of the future development of society and technology are encouraged in the process. • The ability to present the project conception orally and on paper in a clear and appropriate way as well as critical reflection of what has been achieved are important goals of the course. • Profound knowledge about the possibilities of application of digital architectural design methods, techniques and tools to support the architectural design process • The capability to apply methods and tools for generative modeling and digital fabrication to support the architectural design process with specific engineering solutions			

	• A profound experience in the integration and harmonization of automated processes in an architectural project environment. • A basic understanding of the implementation of algorithm-based planning processes in a building environment.
Content of Study	• The project is the focal point of the second semester. It centers on supporting the design of a building serving a variety of functions set in a specific urban location. • Individual presentations on selected topics are held in the course of the seminar. • Materials and details and specific calculations are considered in relevant number. Models and simulations are required. • The use of computational tools at various stages of an architectural project development. • Application of digital design methods and techniques to develop and manage complex design strategies, geometries and interfaces during the design and engineering process as well as considering the later use and building performance.
Forms of Exam	Mid-term and final presentation, Elaboration with presentation and colloquium
Literature / Computational	• Contagious Architecture: Computation, Aesthetics, and Space (Technologies of Lived Abstraction), Luciana Parisi • Computational Design Thinking: Computation Design Thinking (2011), Achim Menges, Sean Ahlquist • Empathic Space: The Computation of Human-Centric Architecture (Architectural Design) (2014) von Christian Derix, Åsmund Izaki • Integrated Design in Contemporary Architecture 1st Edition (2008), Kiel Moe

Module Title	**Contextual Computational Design**			
Module Number	**MIAD P9**			
Module Responsibility	Prof. i. V. Dipl.-Ing. Hans Sachs			
Lecturer	Computational Design: Prof. i. V. Dipl.-Ing. Hans Sachs wiss. Mitarbeiter, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID) Computational			
Status	Mandatory Module	x	Compulsory Module	
Semester	3			
Forms of Teaching	Design Studio with lectures, seminar, studio and desk crits			
Language of Teaching	German / English			
Hours per Week (SWS)	Lecture	1	Other	4
Workload(h)	Lecture	15	Laboratory	60
	Seminar		Workshop	15
	Excursion	30	Work Experience	
	Self-Study	200	Exam (Preparation)	40
Workload total (h)	360			
Credits	12			
Prerequisites	Project of 1. and 2. semester completed			
Goals of study and Competences	. • The ability to develop individual concepts for architectural projects in complicated or highly complicated contexts, using the theoretical knowledge and skills practiced in the specialised modules. • The ability to analyse judge and assess different contextual influences and situations to the benefit of a project. • A profound understanding of the nature of structural, architectural and functional systems in existing buildings. • The ability to present the conception of the project, both orally and on paper in a clear and appropriate way as well as critical reflection of what has been achieved • The students will be qualified to develop independently strategies for learning and research. • Through consultations between the concentrations, students will learn to work in office like situation (laboratory) and how to benefit from the resulting interdisciplinary cross fertilisation. In the teamwork assignments within the overall project, the student will develop conflict management and chair skills. • The student should proof the ability to successfully develop a			

	range of steps from analysis to design concept and definitive design for a factual architectural assignment. • Enhancement of a comprehensive knowledge about digital architectural design methods and specifically the refurbishment of building stock • A basic understanding of algorithm-based planning tools, techniques and strategies in the context of architectural design processes. • The capability to apply, modify and interconnect tools for generative modeling and digital fabrication. • General knowledge and experience in the harmonization of design and construction requirement and development processes through the use of digital tools and the implementation of process oriented planning methods • A comprehensive understanding of the use of computational design and production techniques in the analytical phase, the design development, communication and (re-) presentation and the digital (re-) production of the built environment
Contents of Study	• The design studio is the focal point of the third semester. It centers on a building design in a historical context (Reuse / Extension / New). Methods for analysing the building fabric and its economical, technical and cultural assessments are integrated in the overall design process. • The documentation of the project shows the design as well as the design process. • Materials and details are considered in relevant scales • An accompanying lecture series will illustrate the effect of contextual influences of diverse scales and natures, on the design and design process of architectural projects, show the history and development systems and technologies, climate adapted building design and the history of architectural planning methods (hand drawing, CAAD, generative algorithms, BIM). • Mastering theory and architectural applications of complex geometries and building performance. • A comprehensive integration of contextual data into digital modeling processes. • The use of computational tools to extend and (re-) interpretate design techniques in the process of architectural design and development in example in the survey, operation and deconstruction phase of an architectural project. • A comprehensive integration of computation–based bottom-up strategies in example by using user- or data generated, material-based or physics-driven modeling techniques • The application of computational tools, techniques and methods in re-use design, refurbishment and building design and construction in historic architectural context

Forms of Exam	Mid-term and final presentation
Literature	• Digital media and scripts at the E-learning platform • Bullen, P., Love, P. 2011, 'Factors influencing the adaptive re-use of buildings', Journal of Engineering, Design and Technology Vol. 9 No. 1, pp. 32–46 • van Uffelen, Chris (2010). Re-Use Architecture, Braun Publishing • Pettinari, J. 1980, 'Adaptive Reuse: A Case Study', Journal of Interior Design and Research, Vol. 6, No. 2, pp. 33–42 • Pfammatter, Ulrich (2014). Building for a Changing Culture and Climate. Berlin: Dom Publishers, Berlin. • Preservation Green Lab (2012). The Greenest Building: Quantifying the Environmental Value of Building Reuse • Rabun, J. Stanley and Kelso, Richard (2009). Building Evaluation for Adaptive Reuse and Preservation, Hoboken: John Wiley & Sons, Inc., • BUILT TO LAST. The Sustainable Reuse of Buildings. An Action of the Dublin City Heritage Plan (2004). Dublin City. The Heritage Council. • Michael U. Hensel (Editor) on (2012). Design Innovation for the Built Environment: Research by Design and the Renovation of Practice. Routledge publishers New York • Emergence: The Connected Lives of Ants, Brains, Cities and Software (2002),Steven Johnson • Aesthetics of Sustainable Architecture (2013), Sang Lee • Site Analysis: A Contextual Approach to Sustainable Land Planning and Site Design (2007) James A. LaGro • Experimental Green Strategies: Redefining Ecological Design Research (Architectural Design),(2011), Terri Peters (Editor) • Protocell Architecture: Architectural Design :81 (2011), Neill Spiller, Rachel Armstrong • Contextual Design: Defining Customer-Centered Systems (Interactive Technologies), Hugh Beyer, Karen Holtzblatt • The Architecture of Emergence: The Evolution of Form in Nature and Civilisation (2010), Michael Weinstock • Emergent Technologies and Design: Towards a Biological Paradigm for Architecture (2010) Michael Hensel, Achim Menges, Michael Weinstock • Interdisciplinary Design: New Lessons from Architecture and Engineering (2012),Hanif Kara, Andreas Georgoulias • Architectural Design Vol. 82 Material Computation (2012) Achim Menges (editor)

Module Title	**Climate and Comfort**			
Module Number	**MID S4**			
Module Responsibility	Prof. Rüdiger Lorenz			
Lecturer	Prof. Rüdiger Lorenz, Dr. Manfred Starlinger, Dipl.-Ing. Peter Schuster,			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module FD	**x**	Compulsory Module	
Semester	1			
Forms of Teaching	Lecture, Seminar, Laboratory; Black-board, beamer-presentation; Copies and papers on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	25	Laboratory	12
	Seminar	23	Workshop	
	Excursion		Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	None			
Goal of study / Competences	• gain specific knowledge and skills about integrative climate adaptive building and facade design, • gain specific knowledge about project design and planning with regard to ecological and economical aspects of building physics and technical equipment, • further discussion and detailed development of the representative design project (MIAD P1) as a climate adapted and comfortable building • apply the presented contents in different software and simulation of climatic behaviour for the given situation, • present and discuss the results in the plenum.			

Contents of Study	• lectures deal with: legal requirements regarding heat protection, energy saving, solar gains, detail aspects (especially thermal bridges), comfort interaction with the facade, integration of technical equipment into building and facade, sun shading aspects, soundproofing, acoustic effects, • aspects of different curtain wall and facade typologies and technologies regarding climate and comfort.
Forms of Exam	Written Exam and Eleboration with colloquium
Literature	• Digital media and scripts at the E-learning platform • Zeumer, Martin; El khouli, Sebastian; John, Viola (2014). • Nachhaltig Konstrieren. Vom Tragwerksentwurf bis zur Materialwahl – Gebäude ökologisch bilanzieren und optimieren. Reihe Detail Green Books, München: Institut für internationale Architektur-Dokumentation

Module Title	**Planning, Detailing and Production**			
Module Number	**MID S5**			
Module Responsibility	Prof. Dr.-Ing. Winfried Heusler			
Lecturer	Prof. Dr.-Ing. Winfried Heusler, Dipl.-Ing. MEng. Daniel Arztmann, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module FD	**x**	Compulsory Module	
Semester	2			
Forms of Teaching	Lecture, Seminar, Excursion, Workshop; copies and papers on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	24	Laboratory	
	Seminar	12	Workshop	12
	Excursion	12	Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	Project and Modules of Semester 1			
Goal of study / Competences	• gain knowledge about system solutions (products, tools and services) • gain specific knowledge about using façade systems (incl. cost estimation) • gain basic knowledge about developing project specific facades (custom solutions) • gain basic knowledge about project management, project design and planning with regard to ecological and economical aspects as well as regulations and standards, • specific understanding of construction technologies, (fabrication , assembling and installation) for façade systems. • handling and layout of details and constructional drafts and sections with CAD software-tools, • handling with 2D and 3D construction-tools to create fabrication and assembly plans,			

	• present and discuss case studies and the results in the plenum.
Contents of Study	• lectures on specific aspects of the planning, detailing and construction of different curtain wall and facade typologies and technologies regarding costs, climate and comfort. • Hands-on practical technical training on how to assemble a post and rail facade mock-up. • Overview of current planning software with training and application in the course with special project exercises (e.g. SchüCad+, SchüCad+3D, Athena and other proprietary softwares)
Forms of Exam	Elaboration with Colloquium and Written Exam
Literature	• Block, P., Knippers, J., Mitra, N.J., Wang, W. (Eds.) (2014). Advances in Architectural Geometry 2014, Wien: Springer • Compagno, Andrea (2002). Intelligent Glass Facades. Berlin: Birkhäuser Verlag. • Hausladen, Gerhard et al (2006). Clima Skin. München: Callwey Verlag. • Hauschild, Moritz (2010). Digitale Prozesse. München: Detail Praxis • Herzog, Thomas et al (2005). Facade Construction Manual. Basel: Birkhäuser Verlag. • Knaack, Ulrich; Klein, Tilmann; Bilow, Marcel (2012). Principles of Construction - Facades. Basel: Birkhäuser Verlag. • Oesterle, Eberhard et al (2001). Double-Skin Facades. Prestel. • Pottgiesser, Uta (2004). Fassadenschichtungen Glas. Berlin: Bauwerk Verlag, Berlin • Renkens, Just (1997). Fassaden und Architektur. Delft: FAECF Verlag. • Tedeschi, Arturo (2008). Parametric Architecture with Grasshopper. Brienza: Le Penseur. • Vollers, Karel (2001). Twist&Build, creating non-orthogonal architecture. Rotterdam: 010 Publishers • Digital media and scripts at the E-learning platform • company´s records and documents

Module Title	**Materials, Surfaces and Security**			
Module Number	**MID S6**			
Module Responsibility	Prof. Dr. Uta Pottgiesser			
Lecturer	Prof. Dr. Uta Pottgiesser, Prof. Dr.-Ing. Winfried Heusler, MEng. Daniel Arztmann, Dipl.-Ing. Andreas Bittis, Dipl.-Ing. Matthias Brandes, Dr. Hans Schumann			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module FD	**x**	Compulsory Module	
Semester	3			
Forms of Teaching	Lecture, Seminar, Excursion, Workshops; Copies and papers on digital media (via ILIAS)			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	24	Laboratory	12
	Seminar	18	Workshop	
	Excursion	8	Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	Modules of semester 1 + 2			
Goal of study / Competences	• gain advanced knowledge of specific requirements and solutions for facades and their components. • gain detailed knowledge of glass (historical and current types, products, standards and regulations) • gain detailed knowledge of metal (historical and current types, products, standards and regulations) • gain detailed knowledge of façade systems for specific requirements regarding functional security (fire and smoke protection, burglar, bullet, blast and earthquake resistance) • gain detailed knowledge on surface treatments (technologies, standards and regulations) • gain knowledge about daylighting systems (principles, products and standards), • present and discuss the results in the plenum.			

Contents of Study	• lectures on specific aspects of facades (e. g. combination of materials, finishes and coatings; combination of energetic, thermal, acoustic and structural requirements; combination of security requirements; combination of daylighting and sunshading requirements), • lectures deal with: legal requirements, detail aspects, comfort interaction with the facade, integration of technical equipment (e. g. sensors and motors) into the facade
Forms of Exam	Elaboration with Colloquium and Written Exam
Literature	• Digital media and scripts at the E-learning platform • Harris (2001). Building Pathology. Wiley, 1st edition • Dwight (1999). Aluminum Design and Construction. E&F Spoon • Herzog, Thomas et al (2005). Facade Construction Manual. Basel: Birkhäuser Verlag. • Hurley, Morgan J. (2016). SFPE Handbook of Fire Protection Engineering. Springer. • Patterson, Mic (2011). Structural Glass Facades and Enclosures. Wiley. • Schittich, Christian et al (2007). Glass Construction Manual. Basel: Birkhäuser Verlag. • Schweitzer, Philipp A. (2006). Corrosion Engineering Handboo: Atmospheric and Media Corrosion of Metals. CRC Press. • Renkens, Just (1997). Fassaden und Architektur. Delft: FAECF Verlag, • Weller, Bernhard (2009). Glass in Building. Principles, Applications, Examples. Detail Practice. Birkhäuser Architecture • company´s records and documents

Module Title	**Programming and Simulation**			
Module Number	**MIAD S7**			
Module Responsibility	Prof. Dipl.-Ing. Jens-Uwe Schulz			
Lecturer	Prof. Dipl.-Ing. Jens-Uwe Schulz, Lehrbeauftragte			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module CD	**x**	Compulsory Module	
Semester	2			
Forms of Teaching	Lecture, Seminar, Workshops			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	30	Laboratory	
	Seminar	30	Workshop	10
	Excursion		Work Experience	
	Self Study	90	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	Tools 1			
Goal of study / Competences	• Developing a basic competence in programming. • Learning programming processes with a view to writing a program of your own. • Overview information on the engineering fundamentals of numerical simulation methods for the form finding and the thermodynamic properties of building components. • Survey of specific software products and their interfaces with other planning software products (architecture, load-bearing structures, building integrated services). • Ability to choose and apply engineering planning tools for the establishment of parameters and internal forces in the area of structural planning and building physics.			
Contents of Study	• Basic knowledge of programming based on Python in application-oriented seminars. • Basic elements of common simulation methods (FEM, CFD, FDM, CAO, SKO). • Introduction to and application of specific software including			

	its interface with other planning software products. • Application to simple, practical problems. • Teaching of basic knowledge in the use of specific software applications from the areas of the planning of load-bearing structures and building physics. • Investigation of the planning interfaces between architect and planners using practical problems.
Forms of Exam	Project based Elaboration and Colloquium
Literature	• Schulz, J.-U.: Programming and Simulation. Script • Issa, R. (2010). Essential Mathematics for Computational Design. http://www.rhino3d.com/download/Rhino/4.0/EssentialMathematics. • Issa, R. (2014). Essential Mathematics for Computational Design, 3nd edition. Robert McNeel & Associates • Pottmann, H., Asperl, A., Hofer, M. and A. Kilian (2007). Architectural Geometry, Bentley Institute Press • Malthe-Sørenssen, A.: Elementary Mechanics Using Python. Springer, • Fish, J.; Belytschko, T. (2007). A First Course in Finite Elements. John Wiley & Sons • Khennane, A. (2013). Introduction to finite element analysis using MATLAB and Abaqus. CRC Press

Modultitel	**Digital Fabrication**			
Modulnummer	**MID S8**			
Modulverantwortliche/r	Prof. i.V. Hans Sachs			
Lehrende	Prof. i.V. Hans Sachs, Dipl.-Ing. David Lemberski, Dipl.-Ing. Guido Brand			
Studiengang	Master Integrated Design (MID)			
Status	Pflichtmodul CD	x	Wahlpflichtmodul	
Regelsemester	2			
Lehrformen	Vorlesung, Seminar			
Lehrsprache	English			
Umfang (SWS)	4			
Umfang (SWS)	Vorlesung	2	andere	2
Workload (h)	Vorlesung	24	Übung	
	Seminar	12	Workshop	24
	Exkursion		Praktikum	
	Selbststudium	100	Prüfungsvorbereitung	20
Workload gesamt (h)	180			
Credits	6			
Voraussetzungen				
Lernziele und Kompetenzen	• Aufzeigen des Einflusses und der Möglichkeiten veränderter Produktionsbedingungen durch den Einsatz computergestützter Fertigungsverfahren. • Verständnis und Fähigkeit zur Bewertung maschinengestützter Fabrikationsmethoden in der Architektur und in angrenzenden Bereichen. • Vermittlung von Grundlagen und weiterführenden Kenntnissen additiver, subtraktiver und umformenden Produktionsverfahren sowie deren Automatisierung			
Inhalt	• Übersicht der wichtigsten additiven, subtraktiven und umformenden digitalen Fertigungstechnologien und deren Materialgruppen • Anwendung unterschiedlicher digitaler Fabrikationsmethoden anhand von praxisbezogenen Bespielen und Konstruktionen, z.B.: Übertragung digitaler 2D- und 3D Daten an CAD-CAM fähige Produktionsmaschinen oder generative Rapid-			

	Prototyping-Verfahren. • Die Vorlesung stellt die unterschiedlichen Verfahren vor und analysiert sie in einem theoretischen Kontext. • Ausblick auf zukünftige Entwicklungen im Bereich Digitaler Fabrikation und angrenzende Produktionsbereiche • Die Lehrinhalte werden durch Exkursionen, Betriebsbesichtigungen und Messebesuche ergänzt.
Prüfungsform	Elaboration with Colloquium (Studienarbeit mit Kolloquium)
Literatur	• Cache, B., & Speaks, M. (1995). Earth moves: the furnishing of territories. MIT Press. • Iwamoto, L. (2009). Digital Fabrications. Architectural and Material Techniques, New York. • Sennett, R. (2009). The Craftsman. Yale University Press • Dunn (2012). Digital Fabrication in Architecture. Laurence King • Caneparo, L. (2014). Digital fabrication in architecture, engineering and construction. A. Cerrato (Ed.). Springer. • Beorkrem, C. (2012). Material Strategies in Digital Fabrication. Routledge: 1st Edition • Kolarevic, B. (2005). Architecture in the Digital Age: Design and Manufacturing. Taylor & Francis Ltd • Sheil, B. (2005). Design through making: An introduction. Architectural Design, 75(4), 5-12. • Sheil, B. (Ed.). (2012). Manufacturing the bespoke: making and prototyping architecture. John Wiley & Sons.

Module Title	**Computational Optimization**			
Module Number	**MID S9**			
Module Respons9bility	Prof. Dipl.-Ing. Jens-Uwe Schulz			
Lecturer	Prof. Dipl.-Ing. Jens-Uwe Schulz, M.Eng Patric Günther, M.Eng. Manuel Sotomayor			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module CD	**x**	Compulsory Module	
Semester	3			
Forms of Teaching	Lecture, Seminar, workshops, hands-on training			
Language of Teaching	English			
Hours per Week (SWS)	4			
Hours per Week (SWS)	Lecture	2	Other	2
Workload(h)	Lecture	20	Laboratory	
	Seminar	20	Workshop	20
	Excursion		Work Experience	
	Self Study	100	Exam Preparation	20
Workload total (h)	180			
Credits	6			
Prerequisites	Tools 1, Tools 2			
Goal of study / Competences	• facilitate the capabilities to identify and describe a problem • foundation of different optimization methods and its area of operation • Identification of a suitable optimization process for a given problem • Integration of optimization algorithms in a planning process • competence to judge the computed results			
Contents of Study	• the study of optimization integrates design and structural decisions, to create optimal solutions within set parameters. These solutions are often structural: and aim to reduce the amount material, span further, and leverage structural latencies. Optimization can also be applied to building program, function and form. The two leading domains of optimization are: shape optimization and topological optimization. Both forms of optimization attempt to reach an optimal solution with respect to a set of parameters that define a fitness func-			

	tion. • Both approaches share the same procedural logic: initial geometry and boundary conditions are defined that control the optimization; definition of one or more fitness functions. • though the fundamental process is the same for both techniques, there are conceptural and algorithmic differences. • this module will give you theoreticaly understanding of how optimization algorithms are working and how they are applicable for solving architectural and structural problems. • Lectures about theoretical foundations of different optimization methods, genetic, multi criteria, single value, etc. • mathematical description of optimization problems, development of fitness functions and basic understandings about fitness landscapes • students will solve individually defined optimization problems
Forms of Exam	Elaboration with Colloquium (Studienarbeit mit Kolloquium)
Literature	• Akos, Gil (2014). The Grasshopper Primer Third Edition. Retrieved from: https://issuu.com/pabloherrera/docs/mode_lab_grasshopper_primer_third_e • Davis, Daniel (2013). Modelled on Software Engineering: Flexible Parametric Models in the Practice of Architecture, PhD • Eigensatz, Michael et al. (2010). Case Studies in Cost-Optimized Paneling of Architectural Freeform Surfaces. In: Advances in Architectural Geometry 2010. http://lgg.epfl.ch/publications/2010/eigensatz_2010_cop.pdf • Gehry Technologies: Museo Soumaya, Facade Design to Fabrication. retrieved from: https://issuu.com/gehrytech/docs/sou_06_issuu_version, • Goulthorpe, Mark: The Possibility of (an) Architecture, (collected Essays) • Issa, R. (2014). Essential Mathematics for Computational Design, 3nd edition. Robert McNeel & Associates • Gerdes, Ingrid, Klawonn, Frank, Kruse, Rudolf (2004). Evolutionäre Algorithmen. Genetische Algorithmen - Strategien und Optimierungsverfahren – Beispielanwendungen. Springer Vieweg • Pottmann, H., Asperl, A., Hofer, M. and A. Kilian (2007). Architectural Geometry, Bentley Institute Press. • Samimi, Mojtaba and Farshad Nasrollahi (2014). Intelligent Design using Solar-Climatic Vision: Energy and Comfort Improvement in Architecture and Urban Planning using SOLARCHVISION (Young Cities Research Paper Series). TU Berlin. • Vollers, Karel (2001). Twist & Build: Creating Non-orthogonal Architecture. 010 Uitgeverij • Weise, Thomas (2009). Global Optimization Algorithms -Theory and Application. Ebook. Newest Version:http://www.it-weise.de; retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.569.5284&rep=rep1&type=pdf

Module Title	**Masterthesis**			
Module Number	**MID T**			
Module Responsibility	All professors			
Lecturer	from the course, all external lecturers from external partners can act as supervisors for the thesis.			
Course of Study	Master Integrated Design (MID)			
Status	Mandatory Module	**x**	Compulsory Module	
Semester	4			
Forms of Teaching	Self-organized final project for the master course; Literature on digital media (via ILIAS); selected feedbacks and critics;			
Language of Teaching	English			
Hours per Week (SWS)	0,4			
Hours per Week (SWS)	Lecture		Other	0,4
Workload(h)	Lecture		Laboratory	
	Seminar	3	Workshop	2
	Excursion		Work Experience	
	Self Study	850	Exam Preparation	45
Workload total (h)	900			
Credits	30			
Prerequisites	All Modules of the master course			
Goal of study / Competences	• finalising the course of studies in a holistic interdisciplinary approach to practise facade or computational design a an expert / specialist • Production and documentation of independent solutions to complex problems related to computational or façade design using scientific knowledge and methods within a prescribed deadline. • Understanding of in-depth and skilled scientific knowledge and approaches relating to design and construction of a technical and methodological nature. • produce responsible solutions to complex problems both in practice and in research and development in a scientific manner using skilled design, construction, technical and			

	methodological knowledge and abilities.
Contents of Study	• participants obtain list of topics that are offered by the docents, • own topics can be chosen after coordinating with the board of examination and the first supervisor, • specific topics can be chosen in cooperation with external and industry partners, • the master thesis normally consists of an independent task with a methodological, technical-constructional or organisational assignment, • depending on the type of assignment, a draft, a model, a piece of work or a written or digital composition should be prepared, • the master thesis may also be a theoretical work with specialist content.
Forms of Exam	Elaboration with presentation and colloquium
Literature	• Papers on digital media (CD-ROM / Internet / e-learning), • Company's records and documents • Literature depending on the topic