

APPROVED**ARCH8028: Technical Design for Retrofit**

Module Details	
Module Code:	ARCH8028
Title:	Technical Design for Retrofit APPROVED
Long Title:	Technical Design for Retrofit
NFQ Level:	Advanced
Valid From:	Semester 1 - 2022/23 (September 2022)
Duration:	1 Semester
Credits:	10
Field of Study:	5810 - Architecture & Urban Environment
Module Delivered in:	1 programme(s)
Module Description:	Technical Design for Retrofit focuses on interventions to an existing structure to produce a building with improved energy performance and comfort based on application of research and industry practice. Structural systems, envelope design and legislative requirements are considered and addressed.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	Learning Outcome Description
LO1	Investigate and analyze the structure and fabric of an existing building (highlighting issues/problems) as a basis to developing an approach to retrofitting that complies with Building Regulations.
LO2	Propose modifications to the internal layout to demonstrate improved circulation to, from and around the building and access to service systems within the building in compliance with building regulations and health and safety.
LO3	Propose envelope strategies for the entire building envelope to reduce energy use and improve comfort
LO4	Use software to assess and optimize the building performance.
LO5	Research, analyse and propose structural strategies for the modification of an existing structure
Dependencies	
Module Recommendations	
Incompatible Modules	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
No requirements listed	

Indicative Content
Building Analysis Study of the existing structure and building fabric highlighting the key problems areas in relation to heat loss & thermal bridging, air tightness and moisture movement.
Policies & Legislation Energy Performance in Buildings Directive (EPBD) Nearly Zero Energy Building (nZEB) performance standard. Compliance with national legislative building regulations.
Energy Calculations Theory, principles and software application for 2D analysis of construction details to determine planar fabric heat loss, (U-value), interstitial condensation, and surface condensation and mould (fRsi)
Structure & Building Fabric Exploration of structural solutions, material selection, specification and installation appropriate for the retrofit of a multi-storey commercial building.
Technical Design Integration of architectural technical design, construction methods, systems and detailing, materials and specification, and regulation to produce a coherent proposal.

Module Content & Assessment	
Assessment Breakdown	%
Coursework	100.00%

Assessments

Coursework			
Assessment Type	Presentation	% of Total Mark	25
Timing	Week 4	Learning Outcomes	1,4
Assessment Description Stage 1 – Investigate and analyze an existing building. Produce an annotated photographic survey and a set of drawings: context, site plan, structure, layout and building fabric as a basis for a retrofit proposal. Undertake and present heat loss calculations and analysis.			
Assessment Type	Critique	% of Total Mark	35
Timing	Week 9	Learning Outcomes	1,2,3,4,5
Assessment Description Stage 2 – Feasibility study & preliminary schematic design proposal: applying regulation and using building fabric analysis to inform design solutions for the retrofit of an existing building.			
Assessment Type	Critique	% of Total Mark	40
Timing	Sem End	Learning Outcomes	2,3,4,5
Assessment Description Stage 3 – Updated design strategies: propose technical solutions that address the performance issues of the retrofit building through redesign of floor plan/roof layout and envelope/façade design complying with legislation.			
No End of Module Formal Examination			
Reassessment Requirement			
Coursework Only This module is reassessed solely on the basis of re-submitted coursework. There is no repeat written examination.			

Module Workload

Workload: Full Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Tutorial	Contact	Individual tutorial	Every Week	0.50	0.5
Lecture	Contact	Studio based delivery of module	Every Week	1.00	1
Independent & Directed Learning (Non-contact)	Non Contact	Completion of studio assignments	Every Week	12.50	12.5
Total Hours					14.00
Total Weekly Learner Workload					14.00
Total Weekly Contact Hours					1.50

Workload: Part Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Studio based delivery of module	Every Week	1.00	1
Tutorial	Contact	Individual Tutorial	Every Week	0.50	0.5
Independent & Directed Learning (Non-contact)	Non Contact	Completion of studio assignments	Every Week	12.50	12.5
Total Hours					14.00
Total Weekly Learner Workload					14.00
Total Weekly Contact Hours					1.50

Module Resources

Recommended Book Resources

Watts, Andrew. (2019), Modern Construction Envelopes: Systems for architectural design and prototyping, 3rd. Birkhauser, [ISBN: 9783035617702].

Herzog T, Krippner R, Lang W. (2018), Facade Construction Manual, 3rd. DETAIL, [ISBN: 9783955533697].

Knaack U, Klein T, Bilow M. (2014), FACADES Principles of Construction, 2nd. Birkhauser, [ISBN: 9783038210443].

Ajla Aksamija & Perkins + Will. (2013), Sustainable Facades, 1st. John Wiley & Sons, New Jersey, [ISBN: 978-1-118-45860-0].

Andrew Hall (Editor). (2010), Details in Architecture, 1st. The Images Publishing Group Pty Ltd, Australia, [ISBN: 9781864703429].

Margit Pfundstein, Roland Gellert. (2008), Insulating Materials: Principles, Materials, Applications, 1st. Birkhauser, Basel, Switzerland, [ISBN: 978-3-7643-8654-2].

James Douglas. (2006), Building Adaptation, 2nd. Butterworth Heinemann, Oxford, [ISBN: 978-0750666671].

Recommended Article/Paper Resources

Nicol, F & Spires, B. (2013), The limits of thermal comfort: avoiding overheating in European buildings, CIBSE TM52.

Other Resources

website, International Passive House Association, on-line passipedia resource database,
http://www.passipedia.org/passipedia_en/planning/nonresidential_passive_house_buildings/passive_house_schools

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_CARCT_8	Bachelor of Science (Honours) in Architectural Technology	-1	Mandatory