INTERNATIONAL QUALIFICATIONS

AND ASSESSMENT CENTRE (IQAC)

Approved»

2025 y. «___» _____

Programme	**Level 4 Extended Diploma in Architecture**		
Unit Number/ Unit Title	**Unit 2 Mathematics for Interior Design and Architecture**		
Cohort Code:	L04MIA-U2		
Unit Level	4 level		
Total Credits/Hours	Total qualification time 200/ Total Guided learning hours 90/ Self-guided learning hours 110		
Credits	12 CATS/ 6 ECTS		
Lecturer			
Start Date		**End Date**	

Unit Aims	This unit aims to provide learners with core mathematical principles and techniques that underpin architectural and interior design. Learners will apply geometry, algebra, and trigonometry to scale drawings, measurements, and spatial reasoning. Emphasis is placed on using mathematics to solve real-world design challenges related to structure, aesthetics, and functionality.
Differentiation Strategies *(e.g. planned activities or support for individual learners according to their needs)*	Various approaches to addressing the various identified students' needs will be adopted throughout the lesson. Such will include: 1. Progressive tasks 2. Digital resources 3. Verbal support 4. Variable outcomes 5. Collaborative learning 6. Ongoing assessment 7. Flexible-pace learning

Equality & Diversity	Variety of teaching techniques will be employed to ensure that the needs of each individual learner are met.
Safeguarding & Prevent	Safeguarding policies and the Prevent duty are strictly observed to ensure the safety, well-being, and inclusivity of all students and staff.
Health & Safety	SIRM H&S policies will be maintained.
Learning Resources	**Teaching and Learning Materials** • Ching, F. D. K. (2015). Building Construction Illustrated. Wiley. • Bird, J. (2017). Basic Engineering Mathematics. Routledge. • Liebing, R. W. (2001). Architectural Working Drawings. Wiley. • Laseau, P. (2001). Graphic Thinking for Architects and Designers. Wiley. • French, T. E., & Vierck, C. J. (2014). Engineering Drawing and Design. Delmar.

Learning Outcome (The learner will:)	Assessment Criteria (The learner can:)
LO1. Apply geometric principles to architectural and interior layouts.	1. Practical Task: 1.1 Use 2D and 3D geometric constructs to create and interpret technical drawings. 1.2 Apply symmetry, tessellation, and transformations in spatial design.
LO2. Use algebraic and numerical techniques in design calculations.	2. Written Report: 2.1 Solve problems involving ratios, proportions, and linear equations relevant to interior and building measurements. 2.2 Apply units and conversions accurately in design contexts.
LO3. Apply trigonometry and calculus to design and construction challenges.	3. Project-Based Assignment: 3.1 Use trigonometric functions for slope, height, and angle calculations. 3.2 Demonstrate understanding of rates of change in curved forms and structures.
LO4. Interpret and use statistical data in environmental and design decisions.	4. Portfolio Submission: 4.1 Analyze statistical data related to lighting, acoustics, or energy efficiency. 4.2 Create visual representations (e.g., graphs, charts) for client or stakeholder use.
LO5. Integrate mathematical tools and software in design workflows.	5. Practical Lab Work: 5.1 Use CAD tools and spreadsheets for numerical design inputs. 5.2 Evaluate accuracy and efficiency of digital tools in solving design problems.

No	Topic	Learning Outcomes for Each Topic	Which assessment criteria does the session relate to?	Day/month/ year/ signature
1	Introduction to Mathematics in Design Contexts	Understand the role of math in spatial and structural thinking.	LO1 – LO2	
2	Geometric Shapes and Properties: Points, Lines, Angles, Polygons	Apply geometric reasoning to layout planning.	LO1	
3	Circles, Arcs, and Curves in Interior Design	Use curved geometry in layout and furniture design.	LO1	
4	Area, Perimeter, and Surface Calculations	Solve space planning and material estimation problems.	LO1	
5	2D and 3D Geometric Constructions: Solids and Projections	Develop spatial reasoning with plan and elevation views.	LO1	
6	Scale, Proportion, and Ratios in Interior Architecture	Maintain accurate and aesthetic scaling in drawings.	LO1	
7	Golden Ratio and Mathematical Proportion in Design	Explore aesthetics and harmony in design using math.	LO1	

8	Algebra Basics: Expressions, Variables, and Equations	Solve basic architectural equations (e.g., cost, dimension).	LO2	
9	Formulas and Substitutions in Design-Related Problems	Use standard formulas to calculate costs, materials, or layouts.	LO2	
10	Linear Equations and Proportional Reasoning	Analyze relationships such as slope, angle, or dimension.	LO2	
11	Units, Conversions, and Dimensional Analysis	Accurately convert between metric and imperial systems.	LO2	
12	Measurement Error, Accuracy, and Tolerances	Understand the limits of precision in physical construction.	LO2	
13	Introduction to Trigonometry: Sine, Cosine, and Tangent	Apply angle relationships to stairs, roofs, and lighting.	LO3	
14	Solving Triangles and Angles in Floorplans and Roof Design	Use trigonometry for elevations, heights, and slopes.	LO3	
15	Using Trigonometric Ratios in Real-Life Building Calculations	Determine dimensions and angles in field conditions.	LO3	
16	Midterm	**Midterm assessment** covering all learning outcomes (theory and practical elements)	LO1, LO2, LO3	

17	Introduction to Calculus Concepts: Rates of Change	Understand how form and volume shift across dimensions.	LO3	
18	Practical Applications of Integration in Volume and Curves	Estimate irregular surface areas and fluid spaces.	LO3	
19	Statistics in Design: Mean, Median, Mode, Range	Interpret client data and user needs using descriptive stats.	LO4	
20	Understanding Variability and Standard Deviation	Measure environmental comfort variations (e.g., light, temperature).	LO4	
21	Reading and Interpreting Graphs and Tables	Analyze building performance data or survey results.	LO4	
22	Data Visualization for Designers (Infographics, Charts)	Present environmental or usage data visually in presentations.	LO4	
23	Introduction to Mathematical Software in Design (AutoCAD Calculations, Excel, Rhino)	Integrate numerical reasoning into design tools.	LO5	
24	Parametric Design Concepts and Applications (e.g., Grasshopper)	Use math-based design logic in generative modeling.	LO5	
25	Energy Use and Environmental Modeling Calculations	Apply math in simulating building performance.	LO5	

26	Solar Angles and Daylight Analysis	Use trigonometry and software to enhance environmental design.	LO3 – LO5	
27	BIM-Based Quantity Estimation and Cost Calculation	Automate material and cost estimates in digital workflows.	LO5	
28	Geometry in Furniture, Lighting, and Fixture Design	Apply math to practical interior design elements.	LO1 – LO2	
29	Applied Math Project: Measurement, Layout, and Calculation for a Small Room	Demonstrate comprehensive application of mathematical skills.	LO1 – LO5	
30	Reflection and Portfolio Submission: Math in the Designer's Toolbox	Synthesize knowledge across applications and projects.	LO1 – LO5	
31	Final Exam			