Course title	**Mathematics and Art**				
Course code	**BIMA-270**				
Course type	**Compulsory**				
Level	**1st Cycle**				
Year / Semester	**2nd**				
Teacher's name	**Dr Maria Christoforou**				
ECTS	6	**Lectures / week**	12	**Laboratories / week**	
Course purpose and objectives	The main objectives of the course are to: • Create awareness on the mathematical underpinnings of multimedia practice. • Explore conceptual ramifications of time, as it affects density, quality and clarity of expression in time-based media. • Explore the relationship between mathematics and painting. • Introduce artists and art movements, related to mathematics and art. • Introduce philosophers and mathematicians and their theories, related to mathematics and art. • Discuss the visualization of sound and image over time. • Introduce the techniques that literally make visible the beauty of mathematics. • Introduce creative ideation using known software.				
Learning outcomes	On completing the course, students are expected to be able to: 1. Understand and appreciate the relationship between philosophers, mathematicians, and art. Philosophers and mathematicians such as Pythagoras, Georg Wilhelm Friedrich Hegel, Einstein, Euclid and Polykleitos. 2. Understand and appreciate the relationship between art and math: Analyze terms such as proportion, perspective, symmetry, optical illusions, aesthetics, golden ration, repetition, mandelbrot set, fractals, geometry, box counting theory, Halmos theory, and tessellations. 3. Understand and appreciate the relationship between artistic works and math. Appreciate artists such as Escher, Picasso, Braque, Piet Mondrian and Kandinsky. 4. Understand and appreciate the relationship between art movements and math. Art movements such as Fluxus, Data, Futurism, Cubism and Expressionism. 5. Be able to develop critical and creative thinking. 6. Apply knowledge in practice. 7. Create a digital art piece, influenced and inspired by mathematics.				

Prerequisites	BIMA-260	**Required**	
Course content	Mathematics as a creative art. The connection between math and art. (Key words: Tessellations-Euclidean plane) Mathematics and painting. Relations and similarities. (Key words: Einstein- Jackson Pollock, Kandinsky, Box counting method, fractal expressionism, open vs closed, Picasso-Braque-Cubism, Cezanne Math is beautiful. Creating mathematical art. (Key words: Immanuel Kant, Symmetry, aesthetics, Wilhelm Friedrich Hegel, Golden radio, Moorish tilings, tessellations, Sol LeWritt, Picasso and Braque, Piet Mondrian, Theo Van Doesburg, Mandelbrot set, Fractals) Mathematics and art are related. Perspective in Mathematics and art. (Key words: Polykleitos, perspective, varnishing point, symmetry, camera lucida, optical illusions Parthenon, Pozzo's celling, moon in art, Vincent Van Gogh, Henri Rousseau, Escher) Time art. Art, Music and math (Key words: Chronophotography, Eadweard Muybridge, Marcel Duchamp, Futurists, Giacomo Balla, Pop art, John Cage, George Maciunas (Fluxfilms, Film and Avant-Garde Cinema, Iannis Xenakis). Optical illusions, geometric abstractions, op art. Utopian visions. Infinity interconnects art and mathematics.		
Teaching methodology	Lectures, lab presentations, lab tutorials, individual/group tutorials, practical exercises, assignments and projects.		
Bibliography	Math Art, Stephen Ornes, Union Square & Co, 2019, 978-1-4549-3044-0 Mathematics+art a cultural history, Lynn Gamwell, Princeton University Press, 2016, 9780691165288 Manifold Mirrors, Felipe Cucker, Cambridge University Press, 2013, 0521728768 The Invention of Infinity, J.V. Field, Oxford University Press, New York-Tokyo, 1997, 9780198523949, ebook Geometry and the Visual Arts, Dan Pedoe, Dover Publications, New York, 1983, 9780486244587		
Assessment	Class attendance and performance, assignment, mid-term (written), projects (practical)		
Language	English		