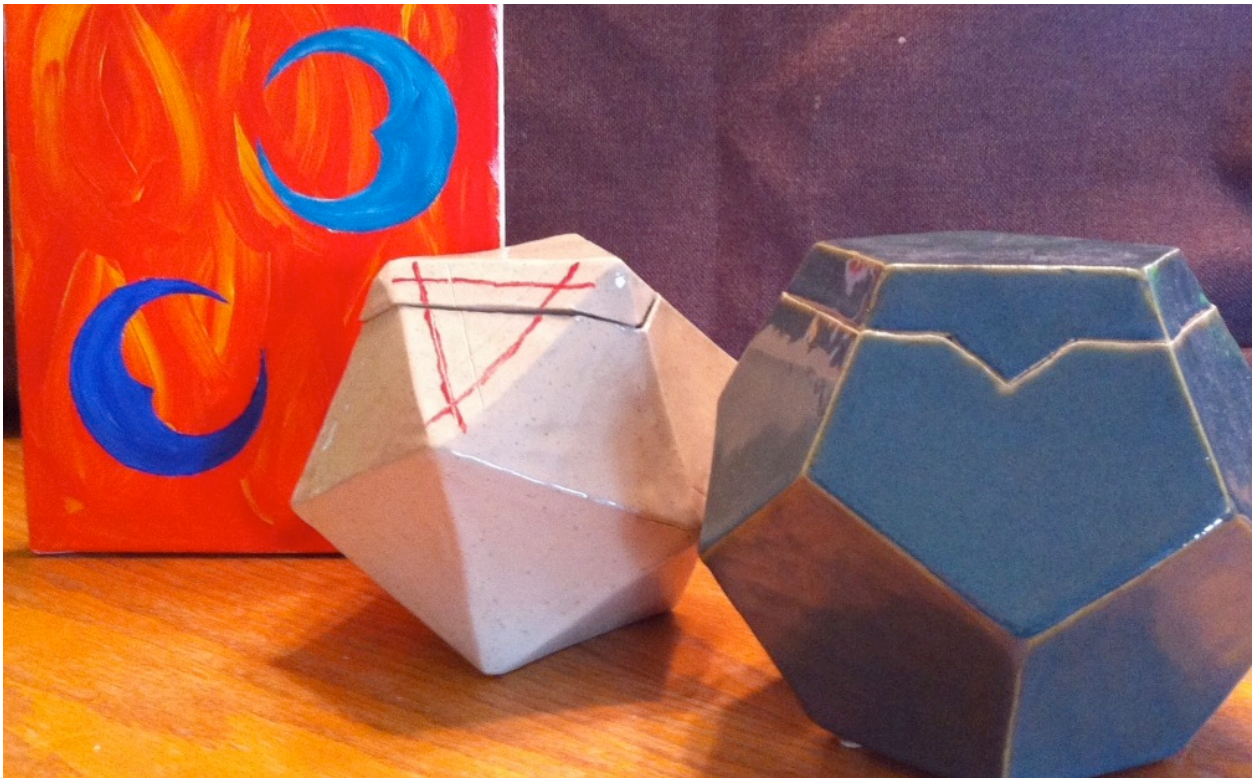
Math 1020/FA 1020

Math In Art

Instructors:

(A01) Tuesday & Thursday 8:30 – 9:45 Michelle Davidson, Math Part
(A02) Tuesday & Thursday 11:30 – 12:45 Darja Kalajdzievska, Math Part
Derek Brueckner, Art Part (A01/A02)



Textbook: ***Math and Art: An Introduction to Visual Mathematics*** by Sasho Kalajdzievski and R. Padmanabhan. [**Note:** all of the royalties for the books sold in the U of M bookstore go back to students through scholarship funds.]

The main themes of study include: golden mean, golden rectangles, Fibonacci spirals, symmetries and other organizing principles, frieze patterns, wall paper groups, tilings & tessellations, fractals, string art and conics, perspective drawing, Platonic solids and regular polyhedra, Escher-style hyperbolic art, and isotopy and homotopy of topological objects.

Scheme of Evaluation:

Art projects (format, deadline to be determined by Art Instructor)	40%
One Mid-Term Exam (to be set by 1020 Math instructors)	25%
Final Exam in December (2 hours, covers all topics, scheduled by registrar)	35%
Total	100%

MATH 1020 is not available to any student already holding a grade of "C" or better in any mathematics course with the exception of MATH 1010 or MATH 1190 or MATH 1191 (136.119). Not to be taken concurrently with any other mathematics courses with the exception of MATH 1010 or MATH 1190 or MATH 1191.

	A	B	C	D
1	Day	**MATH 1020 FA1020, A01, Winter 2016**	Math	Art
2		A **tentative** schedule of topics/dates	MD/DK	DB
3				
4	1	Introduction and Euclidean Constructions (1)	7-Jan	
5	2	Art Lecture		12-Jan
6	3	Euclidean Constructions (2) and Golden Ratio (1)	14-Jan	
7	4	Art Lecture		19-Jan
8	5	Golden Ratio (2)	21-Jan	
9	6	Fibonacci Sequence	26-Jan	
10	7	Art Lecture		28-Jan
11	8	Symmetries (1)	2-Feb	
12	9	Symmetries (2)	4-Feb	
13	10	Art Lecture		9-Feb
14	11	Similarities and Fractals	11-Feb	
15		**Spring Break**	15-Feb	19-Feb
16	12	Art Lecture		23-Feb
17	13	Midterm Review	25-Feb	
18		**Mid-Term Exam written out of class, at 5:30pm**	26-Feb	
19	14	Fractals and Perspective	1-Mar	
20	15	Art Lecture		3-Mar
21	16	Conics	8-Mar	
22	17	Art Lecture		10-Mar
23	18	Platonic Solids and Planar Tilings	15-Mar	
24	19	Hyperbolic Geometry (1)	17-Mar	
25	20	Art Lecture		22-Mar
26	21	Hyperbolic Geometry (2)	24-Mar	
27	22	Art Lecture		29-Mar
28	23	Topology	31-Mar	
29	24	Art Lecture		5-Apr
30	25	Final Exam Review	7-Apr	
31				
32		Final Exam (dates to be determined by U of M)		
33				
34		Art Assignments = 40%		
35		Mid-Term + Final Exam = 25% + 35% = 60%		
36				

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Additional Information

Material covered (refer to the textbook):

Section	Pages	Suggested Problems
1.1. Euclidean Geometry	1-6	
1.2. Euclidean Constructions	6-14	1--8
1.3. Golden Ratio	14-24	1--11
1.4. Fibonacci numbers	24-31	1--6
2.1. Plane Symmetries	33-42	1--9
2.3. Groups of Symmetries	55-60	1--7
2.4. Frieze Patterns (part)	61-72	1--3
2.5. Wallpaper designs; Tilings (part)	72-81	
2.6. Tilings and Art (part)	81-89	
3.1. Similarities	91-100	1--7
3.3. Fractals (part)	100-123	1--4
3.4. Julia Sets (part)	123-131	1--3
4.1. Non-Euclidean Geometries	143-146	
4.2. Inversion	146	
4.3. Hyperbolic Geometry	153-158	
4.4. Hyperbolic Constructions	158-163	1--7
4.5. Tilings in Hyperbolic Plane (part)	163-167	
5.1. Perspective	169-181	1--9
5.3. Polyhedra (part)	197-206	1--4
5.4. Conic Sections (part)	206-216	1--6
6.1. Homotopy	223-230	1--6
6.2. Two-Manifolds and Euler (part)	230-237	1--6
6.3. Other Manifolds (overview only)	237-247	

Information about contacting your Instructor:

(A01)
Dr. M. Davidson
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phone: 204 474 8090
email: davidsom@cc.umanitoba.ca
Office Hours: TBA

(A02)
Darja Kalajdzievska
Office: 427 Machray Hall
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Office Hours: TBA

Web page (maintained by A01 instructor):
http://server.math.umanitoba.ca/homepages/kalajdzi

Web page (maintained by A02 instructor):
http://home.cc.umanitoba.ca/~davidsom/

Another web page which you might find useful
(This was checked at the time this was written):
http://server.maths.umanitoba.ca/homepages/sasho/

Note on Academic Honesty:

The Department of Mathematics, the Faculty of Science and the University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations or assignments as serious offenses and may assess a variety of penalties depending on the nature of the offense.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the "General Academic Regulations and Requirements" of the current Undergraduate Calendar. **Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.**

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (*Student Discipline Bylaw*) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

The Student Discipline Bylaw is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web-page.

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report incidents of academic dishonesty to the Head of the Department.