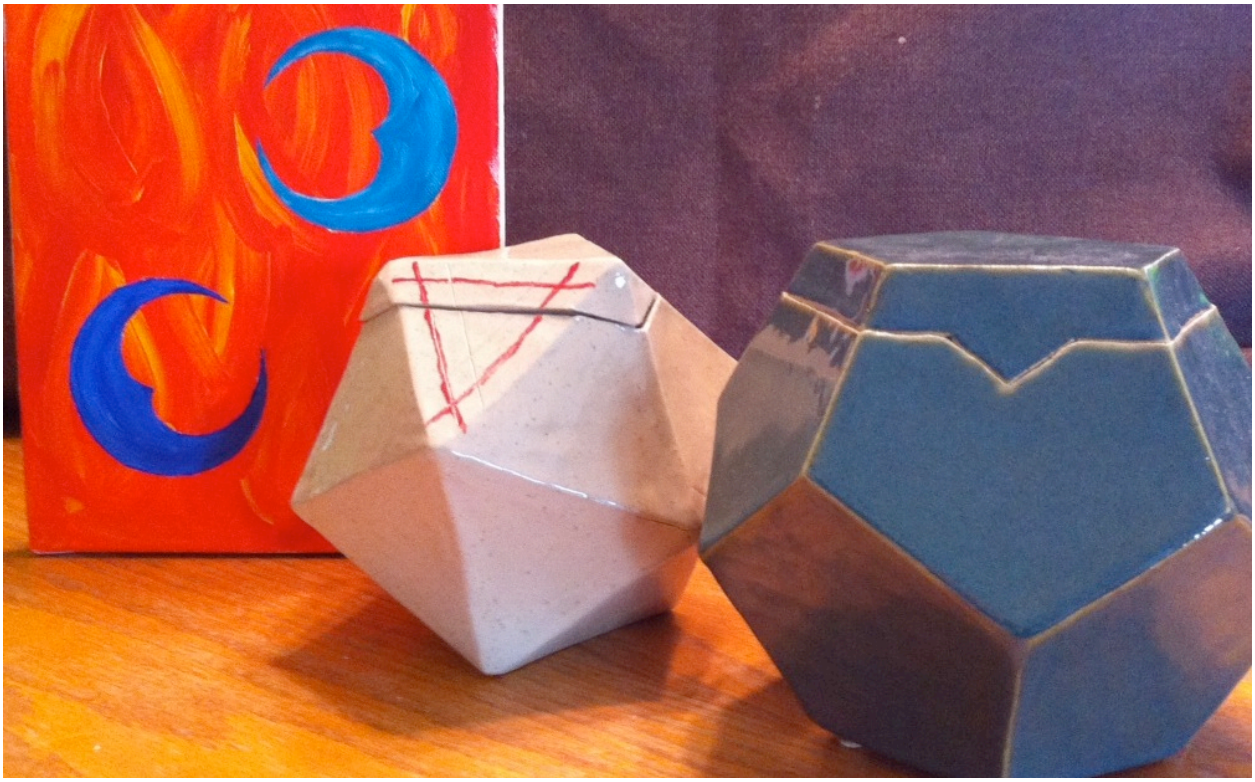
Math 1020/FA 1020

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& A02, Fall 2016**	Math	Art
2		A **tentative** schedule of topics/dates	MD/DK	DB
3				
4	1	Introduction (45 min MATH/30 min FA)	8-Sep	8-Sep
5	2	Euclidean Constructions	13-Sep	
6	3	Art Lecture - Presentation of Art Assignment 1		15-Sep
7	4	Golden Ratio (1)	20-Sep	
8	5	Art Lecture		22-Sep
9	6	Golden Ration (2) and Fibonacci Sequence	27-Sep	
10	7	Art Lecture - Group discussion of classmates' projects in progress		29-Sep
11	8	Symmetries (1)	4-Oct	
12		*Fall Break*	6-Oct	10-Oct
13	9	Art Lecture		11-Oct
14	10	Symmetries (2)	13-Oct	
15	11	Art Lecture - Review of Art Assignment 1		18-Oct
16	12	Similarities - Art Assignment 1 Due **(15%)**	20-Oct	
17	13	Fractals	25-Oct	
18	14	Midterm Review	27-Oct	
19		*Mid-Term Exam written out of class, at 5:30pm* **(25%)**	27-Oct	
20	15	Art Lecture - Presentation of Art Assignment 2		1-Nov
21	16	Perspective	3-Nov	
22	17	Art Lecture		8-Nov
23	18	Conic Sections	10-Nov	
24	19	Platonic Solids and Planar Tilings	15-Nov	
25	20	Art Lecture - Group discussion of classmates' projects in progress		17-Nov
26	21	Hyperbolic Geometry (1)	22-Nov	
27	22	Art Lecture		24-Nov
28	23	Hyperbolic Geometry (2) and Topology (1)	29-Nov	
29	24	Topology (2)	1-Dec	
30	25	Art Lecture - Review of Art Assignment 2		6-Dec
31	26	Final Exam Review - Art assignment 2 due **(25%)**	8-Dec	
32		*Final Exam (dates to be determined by U of M)* **(35%)**		
33		Art Assignments = 40%		
34		Mid-Term + Final Exam = 25% + 35% = 60%		
35				

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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)
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(A02)
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email: kalajdzi@umanitoba.ca
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http://server.math.umanitoba.ca/homepages/kalajdzi

Another web page which you might find useful
http://server.maths.umanitoba.ca/homepages/sasho/

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Class Communication: The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students please visit: http://umanitoba.ca/admin/governance/media/Electronic_Communication_with_Students_Policy_-_2014_06_05.pdf Please note that all communication between myself and you as a student must comply with the electronic communication with student policy (http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html). You are required to obtain and use your U of M email account for all communication between yourself and the university.

Students Accessibility Services: If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services http://umanitoba.ca/student/saa/accessibility/
520 University Centre
204 474 7423
Student_accessibility@umanitoba.ca

Grading: The grade cut-offs listed below show the minimum cut-off ranges for the course. These cut-offs may change (decrease) at the instructors' discretion.

Letter Grade	Percentage out of 100	Grade Point Range	Final Grade Point
A+	95-100	4.25-4.5	4.5
A	86-94	3.75-4.24	4.0
B+	80-85	3.25-3.74	3.5
B	72-29	2.75-3.24	3.0
C+	65-71	2.25-2.74	2.5
C	60-64	2.0-2.24	2.0
D	50-59	Less than 2.0	1.0
F	Less than 50		0

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.