

Course Change Request

Date Submitted: 01/06/20 3:44 pm

Viewing: **MATH 401 : Mathematics through 3D Printing**

Last approved: 02/22/19 4:26 am

Last edit: 01/06/20 3:44 pm

Changes proposed by: csausvil

In Workflow

1. **MATH Chair**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost- Undergraduate
5. Registrar-Courses
6. Banner

Approval Path

1. 01/08/20 3:18 pm
David Walnut
(dwalnut):
Approved for MATH
Chair

History

1. Apr 18, 2018 by Igor
Griva (igriva)
2. Feb 22, 2019 by
Gregory Craft
(gcraft)

Catalog Pages
referencing this
course

[Department of Mathematical Sciences](#)
[Mathematics \(MATH\)](#)

Select modification type:

Simple

Substantial

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2020

Subject Code: MATH - Mathematics

Course Number:
401

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Mathematics through 3D Printing

Banner Title: Math through 3D Printing

Will section titles
vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per
week: 3

Repeatable:

May be only taken once for credit, limited to 3 attempts (N3)

Max Allowable Credits:

9

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

Math 300 or Math MATH 290 and at least 3 credits of Mathematics above MATH 300.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

| And/Or | (| Course/Test Code | Min Grade/Score | Academic Level |) | Concurrency? |
|--------|---|------------------|-----------------|----------------|---|--------------|
| | | | | | | |

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

Incorporates new mathematics from a large variety of fields into the design and creation of 3D printed models, as well as the written and oral communication of these mathematical ideas. Topics vary but might include regular and quasiregular tilings, Platonic and Archimedean solids and their duality, orientable and non-orientable surfaces, fractals, chaotic attractors, Riemann surfaces, and data visualization.

Justification:

We are in the process of changing the course number for Math 290 to Math 300 and I am updating all of the courses that require Math 290 as a prerequisite.

Does this course cover material which crosses into another department? No

Learning Outcomes:

Attach Syllabus

[Math 401_Syllabus and New Syllabus.pdf](#)

Additional Attachments

[MATH 401 Capstone Proposal.pdf](#)

Specialized Course

Categories:

Mason Core

Select the Mason Core Requirement the course is proposing to fulfill:

Foundation

Courses:

Exploration

Courses:

Integration

Courses:

Capstone

Capstone

While each academic degree program defines its learning outcomes, a Capstone course or sequence should follow these guidelines:

- *Minimum of 3 credits*
- *Later in the curriculum, after a student has taken at least 85 credits, and at the 400 - course level*
- *No more than 35 students in the course or equivalent instructional/mentored support*
- *Emphasis on experiential/applied/integrative learning*
- *Allow students to apply critical thinking skills*
- *Learning outcomes defined by the degree program*

Explain how the course meets the expectations that the capstone experience consolidates the knowledge and understanding gained in the student's major, degree, and Mason Core Courses.

Emphasis on experiential/applied/integrative learning: The course is highly experiential and applied. The focus is on creating 3D mathematical prints. These weekly prints are creations which are subsequently on prominent display. They are designed from fundamental scientific and mathematical principles, engineered using software, created using bleeding edge technologies. The students give formal expositions of their work using many forms of written and spoken communication. The students will be required to write up weekly results using many forms of written and oral communication.

The goal of the course is to critically assess and transform high level mathematics in a creative manner to create a physical object or objects every week using 3D printing. This involves thinking and problem solving, including reading cutting edge research mathematics, learning new software and new technology, and using this to best design and create a physical object.

Visualization involves simplification, and thus the students will be required to discover and refine the most important ideas in order to best clarify abstract mathematical concepts via physical objects. Students critically assess and transform high level mathematics in a creative manner to create physical objects. Therefore the class results in students more fully understanding the mathematical concepts that they have learned during their degree.

**Additional
Comments:**

**Reviewer
Comments**