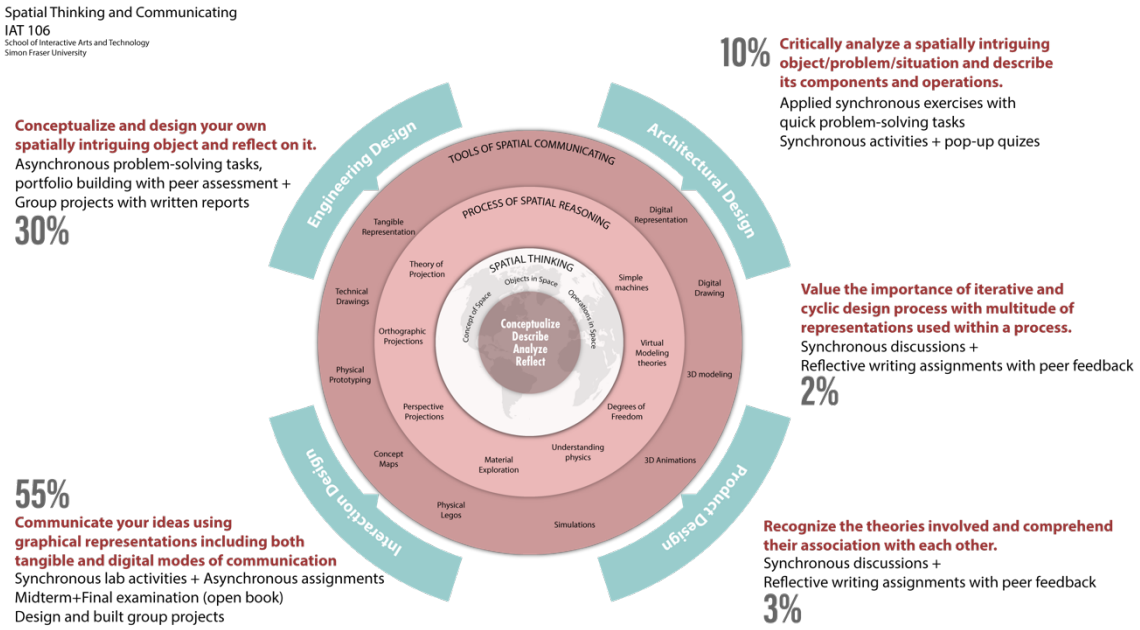
Syllabus
IAT106: Spatial Thinking and Communicating

SPRING 2021 | Naghmi Shireen



This course is an introduction to spatial thinking, graphical representation and communication. As a foundations course, it aims to expose you to spatial thinking concepts and to provide you with the basic knowledge and technical skills required to envision three dimensional structures, visualize and think in three dimensions and to analyze and solve specific spatial thinking problems using sketching, digital modeling, and physical modeling. As you learn to "think spatially", you will start to see and understand the world around in new and useful ways. You will explore ideas individually, share these ideas with others, work in groups, and demonstrate your skills by composing different representations to 'market' your ideas. The course consists of one 2-hour live lecture and one 3-hour live lab each week.

Learning Outcomes:

At the successful completion of IAT106, you will able to;

1. Critically analyze an existing spatially intriguing object/problem/situation and describe its components and operations.
2. Conceptualize and design your own spatially intriguing object and reflect on it.
    - Keeping in view the final form, materials, spatial degrees of freedom within which that object exists.
3. Effectively communicate your ideas using graphical representations including both tangible and digital modes of communication, i.e.,
    - Technical drawings

- Digital modeling
- Physical prototyping

4. Value the importance of iterative and cyclic design process with multitude of representations used within a process.
5. Recognize the inherent affordances and limitations associated with each representation type and accordingly begin the design process with an informed choice of representation.

The course employs the following principles and overall teaching approach:

- labs with practice-based hands-on learning, quizzes, regular feedback
- weekly readings and assignments that build in complexity and degree of difficulty.
- small team-based approach to spatial thinking problems and solutions.
- introduces 3D computer modeling software gradually over the term.

Required Text:

Bertoline, G. E. Wiebe, N. Hartman and W. Ross. 6th edition. Fundamentals of Graphic Communications, McGraw Hill, 2010.

Note: To reduce the cost of the textbook, the book available at the bookstore is a special version of the full text, with just those chapters relevant for this course.

(10-digit ISBN: 1259068641; 13 Digit ISBN: 9781259068645)

Electronic Version Option: In addition to the version you can buy at the bookstore, an electronic version is available for $45.70 US. To purchase access: https://create.mheducation.com/shop/#/catalog/details/?isbn=9781121628151

Student Evaluation:

The course has individual (75%) and team (25%) components (tentative, subject to change).

Lab assignments and homework	35%
Individual quizzes after each lecture	20%
OnShape quiz	5%
Final project	15%
Final exam	25%
TOTAL	**100%**

Academic Honesty and Student Conduct Policies

The course strictly observes SFU's academic integrity policy S10 as detailed at:

https://www.sfu.ca/policies/gazette/student.htmlLinks

Outline:

This is a tentative outline. Changes in content may need to be made to accommodate the schedule:

Week 1: The Nature of Spatial Thinking: Space, Objects and Operations

Week 2: Technical Sketching and Dimensioning

Week 3: Projections, Multiviews and Isometrics

Week 4: Pictorial Projections and Introduction to OnShape

Week 5: Perspective Views and Simple Model Making

Week 6: Auxiliary Views, Cross-Sections, Digital Assemblies

Week 7: Introduction to Mechanisms: Making Things Move

Week 8: Introduction to Final Project

Week 9: Mechanical Mates: Sweeps & Revolves

Week 10: Solid Modeling Theory, Physical Model Making; Constraints in OnShape

Week 11: Physical Model Making: Materials and Fabrication

Week 12: Spatial Thinking in Design

Week 13: Final Preparation and Course Wrap up

Course Policy:

Assignments are due at the start of the lab periods (unless otherwise stated). The late submissions within 24 hours will be marked but a 50% penalty. No assignment will be accepted as submitted after 24 hours of the deadlines, they will be mark as zero.

Any requests for changing lab sections must be directed through the registrar's office.

All students are responsible for printing the lab material (if needed) for that week. No printed handouts will be available from instructors. All lab documents will be available electronically via the course website.

Classroom/Lab Supplies

1. Pencils, sharpeners, eraser; A pen
2. Plain and sketching paper x 30
3. Square grid papers (starting Week 02) x 30
4. Isometric grid papers x 20
5. Cardboard x 4
6. Cutting Board x 1
7. X-acto knife or equivalent (Box cutter); scissors x 1
8. Steel-backed ruler x 1
9. Glue/Masking tape x 1

Online Classroom Etiquettes (or shall I say Netiquettes):

Students are expected to follow this etiquette:

1. Be present for all live lectures and live labs throughout the semester.
2. Be online on time.
3. Listen to the posted lectures before coming to the live lectures.
4. During live lectures and labs:
    - Refrain from disruptive behavior
    - Make use of non-verbal feedback
    - Be clear, concise and transparent in your comments on online content
    - Don't abuse the chat box
    - Set a respectful tone
    - Submit files the right way
    - Read first
    - Think before you type
    - Be kind and professional