

# IAT106: Spatial Thinking and Communicating Syllabus

Semester: Fall 2012

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## Description:

This course is an introduction to spatial thinking, graphical representation and communication. As a foundations course, it aims to expose students to spatial thinking concepts and to provide them 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 students learn to “think spatially”, they will start to see and understand the world around in new and useful ways. Students will explore ideas individually, share these ideas with others, work in groups, and demonstrate their skills by composing different representations to ‘market’ their ideas. The course consists of one 90-minute lecture and one 3-hour lab each week.

## Learning Outcomes:

Students will be able to:

1. Describe and use spatial thinking
2. Use graphical representations and communication in different problem domains such as design, art, medicine, business, and engineering.
3. Examine and interpret 3D representations
4. Visualize and define spatial problems and proposed solutions.
5. Create and manipulate 2D and 3D representations of their solutions to given spatial problems.
6. Select representation tools and techniques and make association among them when working on problems requiring spatial thinking.
7. Use a computational modeling tool (such as a Computer-Aided Design system).

The course employs the following principles and overall teaching approach:

- lectures
- 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. 6<sup>th</sup> ed. 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:

1. go to [www.mcgrawhillcreate.com](http://www.mcgrawhillcreate.com)
2. go to bottom of page and click link called “Bookstore”.
3. on bookstore page, change the country to Canada and search for Simon Fraser
  - you'll see several sfu listings; look for the IAT 106 listing and click on it
  - you'll then be at a page where you can purchase an ecopy.

## Student Evaluation:

### Individual

- Lab assignments, quizzes and homework 30%
- Mid-term exam 1 20%
- Final exam 25%

### Team

- Midterm project 10%
- Final project with poster 15%

**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:** Sketching and dimensioning

**Week 3:** Multiview, pictorial projections

**Week 4:** Multiview, axonometric projections, introduction to Solidworks

Week 5: Model making, Solidworks, spatial problem solving

**Week 6:** Spatial Visualization: Auxiliary Views, Cross-Sections

**Week 7:** Midterm

**Week 8:** Project Phase 1: Representing Ideas in Sketches

**Week 9:** Project Phase 2: Parts and Whole

**Week 10:** Project Phase 2 Continues; digital models of assemblies

**Week 11:** Project Phase 3: Realised Physical and Digital Models

**Week 12:** Project Phase 4: Presentation Preparation

**Week 13:** Project Demos and Competition, Awards and Final Exam Preparation

## Course Policies:

Assignments are due at the start of the lab periods (unless otherwise stated). Assignments handed in after this, but within 24 hours will be marked but a 10% penalty will be applied. Assignments will not be accepted after this (mark will be zero).

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

All students are responsible for printing the lab assignment for that week. No printed handouts will be available from instructors. All lab documents will be available electronically via WebCT.

Students will need to bring with them to every class and lab:

- Pencils and an eraser.
- A pen.
- Both plain and sketching (grid and isometric) paper.
- Some labs will require simple modeling tools: e.g. X-acto knife or similar, masking tape, scissors, and steel-backed ruler

## **Class & Lab Etiquette:**

Students are expected to follow this etiquette:

1. Attend every lecture and lab throughout the semester.
2. Arrive for class and lab on time.
3. Arrive for exams on time so that students may use all the allotted time (according to SFU policy, students arriving more than 30 minutes late are denied entry and get zero for the exam).
4. During class and lab periods:
  - Refrain from disruptive behavior such as holding side conversations and using laptops to surf the web or check e-mail.
  - Students may use their laptops for note-taking only during lectures.
5. Use of cellular phones, iPods, and PDAs is not permitted during lecture and lab. Students seen using any of these may be asked to leave the room for the balance of the lecture or lab.