

POLYHEDRA AND GEODESICS

Dr. Vince Matsko
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Attendance: Please refer to the IMSA 2007–2008 Student Handbook for attendance expectations and policies.

You are expected to come to class prepared every day and be an active participant in all group activities and class discussions.

Course objective: The main objective of this course is to significantly develop spatial visualization skills through methods which may be made accessible to students of all age levels. The main vehicle for this development is the extensive use of hands-on experience, both in and outside the classroom. Results of construction exercises will be analyzed using tools from plane geometry, algebra, and trigonometry, so that this course will integrate several different areas in mathematics through the study of three-dimensional geometry.

Materials needed:

- Text: *Polyhedra and Geodesic Structures*, draft manuscript, by Vincent J. Matsko. The text will be available on a chapter-by-chapter basis electronically.
- Calculator.
- 3-ring binder (or something similar). Please use section dividers to organize your binder into clearly defined sections (e.g., class notes, in-class work, worksheets, homework, quizzes, tests, and so on).
- Tools for building models include:
 - Ruler or straight edge
 - Compass
 - Protractor
 - Awl (or other etching implement)
 - Glue (preferably Elmer's)
 - Tape (if desired for making models quickly)
 - Scissors
 - Cardstock (available, but you might want to get select your own colors by getting your own)

Course components:

- In-class work: there will be some worksheets (like in MI4), and at other times we'll work out problems in class.
- Lecture: As the course progresses, there will be more emphasis on a lecture/discussion format.
- Laboratory: Approximately two days each week, there will be a hands-on laboratory where we build and construct polyhedra. This will be fun! Be sure to have your tools with you on building days.
- Homework: There will be weekly homework assignments, either from the text or from in-class worksheets. Do these! You may work together, but you must write up your work individually. Solutions to problems should not be identical line-for-line.
- Quizzes and exams: At the moment, I do not plan on in-class quizzes and exams. However, if students begin coming to class unprepared, then I will begin giving quizzes as needed.
- Final Project/Presentation: Students should try to have a project chosen by the end of the Third Quarter. More than one student may work on a project, but the scope of such a project will necessarily be more extensive than a one-student project. The project must include the construction of at least one polyhedral model. We will spend several class days working on projects.

The presentation will be in both oral and poster format (similar to IMSAloquium). The last part of the semester will be the oral presentations, and posters will be prominently displayed for the benefit of the entire IMSA community.

Grading policy:

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|---------------------|------|
| Weekly homework | 60% |
| Project content | 20% |
| Oral presentation | 10% |
| Poster presentation | 10% |
| Total | 100% |

As you notice, the Final Project is a big deal! This emphasizes the applied nature of the course. In addition, during the Fourth Quarter, we will usually spend one day each week working on the Final Project, so there will be plenty of opportunities for help and guidance. Be creative! This is your chance to create something really amazing!

Parting comment: You should be having fun in this course! There will be some time at the end of the semester for work on special topics. Let me know what you want to learn more about! The universe of polyhedral explorations is virtually infinite....