DE LA SALLE UNIVERSITY
College of Science
Department of Mathematics

MODEGEO – *Modern Geometry*
Prerequisite: LINEALG, MODEALG *Prerequisite to:*

Instructor:_____ **Contact details:**_____
Consultation Hours:_____ **Class Schedule and Room:**_____

Course Description

A course dealing with the geometries of the Euclidean plane, the sphere and the projective plane. The topics include congruence, isometrics, affine transformations, Desargues Theorem and Pappus Theorem.

Learning Outcomes

On completion of this course, the student is expected to present the following learning outcomes in line with the Expected Lasallian Graduate Attributes (ELGA)

ELGA	Learning Outcome
Critical and Creative Thinker Effective Communicator Lifelong Learner Service-Driven Citizen	Develop an understanding and appreciation of various geometry concepts as linked to other mathematical areas and be able to apply them effectively in dealing with various problems including possible real life applications.

Final Course Output

As evidence of attaining the above learning outcomes, the student is required to submit the following during the indicated dates of the term.

Learning Outcome	Required Output	Due Date
Develop an understanding and appreciation of various geometry concepts as linked to other mathematical areas and apply them effectively in dealing with various problems including possible real life applications.	Create a design that is generated by using a combination of motions	Week 13
	A written group report that highlights interrelation and applications of various geometry concepts	Week 13

Rubric for assessment

Written Group Report

CRITERIA	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Content and Organization (60%)	In-depth and insightful discussion in addition to score 3 performance	Logical sequencing of information throughout. Sufficient supporting details. Clear and effective concluding paragraph	Logical sequencing of information most of the time. Details are given but inadequate to support the topic. Clear concluding paragraph but lacks effectiveness	Information presented with little organization. Most of the details irrelevant. Concluding paragraph not clear
Grammar (30%)		No error	Between one and three errors	More than four errors
Bibliography (10%)		All resources cited	Some of the resources not cited	Majority of the resources not cited

Group Member Assessment

Criteria	**Excellent/4**	**Good/3**	**Satisfactory/2**	**Needs Improvement/1**
Contribution	Group member completed an equal share of work and strived to maintain that equity throughout the project	Group member contributed significantly, but other members clearly contributed more	Group member contributed little toward the project	Group members contributions were insignificant or nonexistent
Dependability	Group member provided	Group member contributions	Group member contributions were	Group member was undependable

	contributions with 100% punctuality and always appeared for group work	were mostly punctual and almost always appeared for group work	regularly late and often missed scheduled group work	forcing other members to take up the slack
Efficiency	Work performed was very useful and contributed significantly to the final product	Participation was inefficient and thus contributions were less than expected	Work performed was inappropriate and mostly useless toward the final product	Work performed was completely ineffective and useless in the final product
Attitude	Group member was very positive and pleasant to work with	Group member didn't complain but offered little enthusiasm	Group member sometimes complained and was somewhat of a burden	Group member often complained and generally demoralized the group

Additional Requirements

Aside from the learning output, the student will be assessed at other times during the term by the following:

- Skills Check (Seatwork/Quizzes/Boardwork)
- Individual/Group Report
- Individual/Group Problem Set

Grading System

	FOR EXEMPTED STUDENTS (w/out Final Exam)	**FOR STUDENTS with FINAL EXAM**	
		with no missed quiz	*With one missed quiz*
Average of quizzes & Project	95%	65%	55%
Project	5%	5%	5%
Final exam	-	30%	40%

Scale:

95-100%	4.0
89-94%	3.5
83-88%	3.0
78-82%	2.5
72-77%	2.0
66-71%	1.5
60-65%	1.0
<60%	0.0

Learning Plan

Learning Outcome	Culminating Topics	Week No.	Learning Activities
Develop an understanding and appreciation of various geometry concepts as linked to other mathematical areas and be able to apply them effectively in dealing with various problems including possible real life applications.	**PLANE EUCLIDEAN GEOMETRY** Review Coordinate Plane The Vector Space $\Re^2$ The Inner-Product Space $\Re^2$ The Euclidean Plane E^2 Lines Orthonormal Pairs Equation of a Line Perpendicular Lines Parallel and Intersecting Lines Reflections Congruence and Isometries • Symmetry Groups • Translations Rotations • Glide Reflections *Structure of the Isometry Group *Fixed Points and Fixed Lines	Week 1-2 Week 3 Week 4-5 Week	Concept mapping Library work Group discussion and presentations Paper and pencil constructions Skills exercises Student self-assessment and reflection

	of Isometries	6-7	
	GEOMETRY ON THE SPHERE Preliminaries from E^3 The Cross-Product Orthogonal Bases Planes Incidence Geometry of the Sphere The Triangle Inequality Parametric Representation of Lines Perpendicular Lines Motions of S^2 Orthogonal Transformations of E^3 *****Euler's Theorem *****Isometries *****Fixed Points and Fixed Lines of Isometries	Week 8 Week 9-11 Week 12-13	Concept mapping Library work Group discussion and presentations Skills exercises Student self-assessment and reflection
	FINAL EXAMINATION	Week 13	

References

Greenber, G. (1979): *Euclidean and Non – Euclidean Geometries, Development & History (2nd edition)* N.Y.: Freeman.

Lingerberg, W. (1984), *Linear Algebra and Geometry*. Springer Verlag.

Ryan, P. (1986). *Euclidean and Non-Euclidean Geometry*. Cambridge University Press

Wald, G. (1971), *Geometry: An Introduction*. Wadsworth Publishing.

Online Resources

Non-Euclidean Geometry: Facts, Discussion Forum, and Encyclopedia Article in *Absolute Astronomy.* Accessed October 11, 2012 from: http://www.absoluteastronomy.com/topics/Non-Euclidean_geometry

Polking (2000) *The Geometry of the Sphere* Accessed October 11, 2012 from: http://www.math.rice.edu/~pcmi/sphere/

Thomson, L. *Tour of Symmetry Groups*. Accessed October 11, 2012 from: http://www.geom.uiuc.edu/~lori/kali/

Class Policies

1. The required minimum number of quizzes for a 3-unit course is 3, and 4 for 4-unit course. No part of the final exam may be considered as one quiz.
2. Cancellation of the lowest quiz is not allowed even if the number of quizzes exceeds the required minimum number of quizzes.
3. As a general policy, no special or make-up tests for missed exams other than the final examination will be given. However, a faculty member may give special exams for
   A. approved absences (where the student concerned officially represented the University at some function or activity).
   B. absences due to serious illness which require hospitalization, death in the family and other reasons which the faculty member deems meritorious.
4. If a student missed two (2) examinations, then he/she will be required to take a make up for the second missed examination.
5. If the student has no valid reason for missing an exam (for example, the student was not prepared to take the exam) then the student receives 0% for the missed quiz.
6. Students who get at least 89% in every quiz are exempted from taking the final examination. Their final grade will be based on the average of their quizzes and other prefinal course requirements. The final grade of exempted students who opt to take the final examination will be based on the prescribed computation of final grades inclusive of a final examination. Students who missed and/or took any special/make-up quiz will not be eligible for exemption.
7. Learning outputs are required and not optional to pass the course.
8. Mobile phones and other forms of communication devices should be on silent mode or turned off during

class.

9. Students are expected to be attentive and exhibit the behavior of a mature and responsible individual during class. They are also expected to come to class on time and prepared.
10. Sleeping, bringing in food and drinks, and wearing a cap and sunglasses in class are not allowed.
11. Students who wish to go to the washroom must politely ask permission and, if given such, they should be back in class within 5 minutes. Only one student at a time may be allowed to leave the classroom for this purpose.
12. Students who are absent from the class for more than 5 meetings will get a final grade of 0.0 in the course.
13. Only students who are officially enrolled in the course are allowed to attend the class meetings.

Approved by:

Dr. Arturo Y. Pacificador, Jr.
Chair, Department of Mathematics