



# UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

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## Undergraduate Programme in Mathematics

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## MODULE HANDBOOK

Module name	Geometry in $n$ -Dimensional Euclidean Space													
Module level, if applicable	Bachelor													
Code, if applicable	MMM-2115													
Subtitle, if applicable	-													
Courses, if applicable	Geometry in $n$ -Dimensional Euclidean Space													
Semester(s) in which the module is taught	3 <sup>th</sup> (third)													
Person responsible for the module	Chair of the Lab. of Analysis													
Lecturer(s)	Imam Solekhudin, Ph.D.													
Language	Bahasa Indonesia													
Relation to curriculum	Bachelor Degree, Elective Course, 3 <sup>rd</sup> semester													
Type of teaching, contact hours	150 minutes lectures and 180 minutes structured activities per week.													
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.													
Credit points	3													
Requirements according to the examination regulations	Students have taken Geometry in $n$ -Dimensional Euclidean Space course (MMM-2115) and have an examination card where the course is stated on.													
Recommended prerequisites	Students have taken Analytic Geometry course (MMM-1106) and have participated in the final examination of the course.													
Module objectives/intended learning outcomes	<p>After completing this course the students will have :</p> <p>CO1. ability to generalize concepts in course analytic geometry into <math>n</math> dimensional Euclidean space.</p> <p>CO2. ability to prove some theorems which are the generalization of the similar theorems in the two and three-dimensional space analytic geometry.</p>													
Content	<ol style="list-style-type: none"> <li><math>n</math> dimensional Euclidean Space ; Norm, Inner product, Orthonormal basis, Direction numbers, Direction Cosines, Direction Angels, Orthogonal Projection.</li> <li>Line-<math>n</math>; Equations of Line-<math>n</math>, Angle between two lines-<math>n</math>, Distance from a point to a line-<math>n</math>, Distance between two lines-<math>n</math>.</li> <li>Hyperplane ; Hesse Equation, Distance from a point to a hyperplane, Normal Equations, Angle between two hyperplanes, line-<math>n</math> and hyperplane.</li> <li>Sphere-<math>n</math>: Equations, Tangent hyperplane, Power, circle-<math>n</math>, Bundle of spheres-<math>n</math>.</li> <li>Quadratic Equations: Ellipsoid <math>n</math>, Hyperboloid <math>n</math>, Paraboloid <math>n</math>, Quadratic equation through <math>2n</math> points.</li> </ol>													
Study and examination requirements and forms of examination	<p>The final mark will be weighted as follows:</p> <table border="1"> <thead> <tr> <th>No</th> <th>Assessment methods (components, activities)</th> <th>Weight (percentage)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Final Examination</td> <td>40</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>35</td> </tr> <tr> <td>4</td> <td>Class Activities: Quiz, Homework, etc.</td> <td>25</td> </tr> </tbody> </table>		No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	40	2	Mid-Term Examination	35	4	Class Activities: Quiz, Homework, etc.	25
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1	Final Examination	40												
2	Mid-Term Examination	35												
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	The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.
Media employed	White/Black Board, LCD Projector, Laptop/Computer
Reading List	<ol style="list-style-type: none"> <li>1. Duncan McLaren Young (D. M. Y.) Sommerville, 1959, <i>Analytical Geometry of Three Dimensional</i>, Cambridge University Press, London.</li> <li>2. Wilhelmus Johannes Vollewens, 1946, <i>Repetitiedictaat Analytische Meetkunde</i>, Delftche Uitgevers Maatschappij, Delft.</li> <li>3. Erwin Kreyzig, 1978, <i>Introduction to Functional Analysis with Application</i>, John Willey and Sons, Canada.</li> </ol>

### PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			v			v			
CO 2			v						v