

PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA  
MASTER OF GEOMATICS ENGINEERING



# BUKU PEDOMAN MATA KULIAH *COURSES MODULE HANDBOOK*

PEMODELAN DEFORMASI DAN GEODINAMIKA  
DEFORMATION AND GEODYNAMICS MODELLING

DEPARTEMEN TEKNIK GEOMATIKA  
Fakultas Teknik Sipil, Perencanaan, dan Kebumihan

*DEPARTMENT OF GEOMATICS ENGINEERING*  
*Faculty of Civil Engineering, Planning, and Geo Engineering*

INSTITUT TEKNOLOGI SEPULUH NOPEMBER



<p><b>Persyaratan sesuai dengan peraturan ujian</b> <i>Requirements according to the examination regulations</i></p>	<p>Minimum 80% kehadiran untuk mengikuti ujian tertulis <i>Minimum 80% attendance in this course in order to take the exams</i></p>
<p><b>Deskripsi Mata Kuliah</b>  <i>Description of Course</i></p>	<p>Dalam kuliah ini dipelajari mengenai ilmu dan konsep dari geodinamika terkait struktur dan dinamika bumi seperti fenomena gunung api, pergerakan lempeng (landslide dan gempa). Setelah mempelajari studi geodinamika ini diharapkan dapat membuka wawasan mahasiswa mengenai pemanfaatan, pengembangan konsep dan prinsip ilmu untuk pengolahan, analisis dan pemodelan data sehingga dapat digunakan untuk kepentingan penelitian mandiri dan pemanfaatan dalam mitigasi bencana.</p> <p><i>In this lecture is studied about the science and concepts of geodynamics related to the structure and dynamics of the earth such as volcanic phenomena, the movement of plates (landslide and earthquake). After studying this geodynamic study, it is expected to open the students' insight into the utilization, concept development and science principles for processing, data analysis and data modelling so that it can be used for independent research and utilization in disaster mitigation.</i></p>
<p><b>Capaian Pembelajaran / Course Learning Outcomes</b>  <i>Module objectives/ Course learning outcomes</i></p>	<ol style="list-style-type: none"> <li>1. Mampu menjelaskan fenomena geodinamika Bumi yang terkait dengan struktur Bumi dan teori tektonik lempeng.</li> <li>2. Mampu mengidentifikasi jenis-jenis fenomena geodinamika Bumi.</li> <li>3. Mampu mengidentifikasi teknologi geodesi yang dapat digunakan untuk melakukan pengamatan geodinamika Bumi.</li> <li>4. Mampu melakukan pengamatan dan analisa geodinamika Bumi menggunakan metode geodetik.</li> <li>5. Mampu menjelaskan aspek geodesi dalam studi deformasi.</li> <li>6. Mampu melakukan studi dan analisis deformasi menggunakan data pengamatan geodetik.</li> <li>7. Mampu menggunakan hasil analisa geodinamika dan deformasi untuk mitigasi bencana.</li> </ol> <p><i>1. Able to explain the Earth's geodynamic phenomena related to the structure of the Earth and plate tectonic theory.</i></p> <p><i>2. Able to identify various types of the Earth's geodynamic phenomena.</i></p>

	<ol style="list-style-type: none"> <li>3. <i>Able to identify geodetic technology that can be used to carry out geodynamic observations of the Earth.</i></li> <li>4. <i>Able to perform observations and analyze the Earth's geodynamics using geodetic methods.</i></li> <li>5. <i>Able to explain the geodetic aspects in deformation studies.</i></li> <li>6. <i>Able to perform studies and analysis of deformation using geodetic observation data.</i></li> <li>7. <i>Able to use the results of geodynamic and deformation analysis for disaster mitigation.</i></li> </ol>																																																																																
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<p><b>Pokok Bahasan</b></p> <p><i>Content</i></p>	<p>Pada kuliah ini mata kuliah yang diberikan adalah:</p> <ol style="list-style-type: none"> <li>1. Pengantar Geodinamika dan Deformasi: Pengantar, Gaya Endogen dan Gaya Eksogen.</li> <li>2. Struktur bumi: lapisan bumi, inti bumi, dan karakteristik bumi.</li> <li>3. Lempeng tektonik: teori rekayasa lempeng, pergeseran benua, dan studi geologi.</li> <li>4. Fenomena geodinamika: gunung berapi, longsor, dan gempa bumi.</li> <li>5. Metode dan survei geodinamika: studi geodinamika dengan SLR, VLBI, dan GPS.</li> <li>6. Studi geodinamika: studi tentang pergerakan lempeng global, regional, dan mitigasi bencana.</li> </ol> <p><i>In this lecture the subjects given are:</i></p> <ol style="list-style-type: none"> <li>1. <i>Introduction to Geodynamics and Deformation: Introduction, Endogenous styles, and exogenous styles.</i></li> <li>2. <i>Earth structure: the earth's layers, the earth's core, and the earth's characteristics.</i></li> <li>3. <i>Plate tectonics: plate engineering theory, continental drift, and geological studies.</i></li> <li>4. <i>Geodynamic phenomena: volcanoes, land slides, and earthquakes.</i></li> </ol>																																																																																

	<p>5. <i>Geodynamic methods and surveys: geodynamic studies with SLR, VLBI, and GPS.</i></p> <p>6. <i>Geodynamic studies: study of global plate movements, regional, and disaster mitigation.</i></p>														
<p><b>Pembelajaran dan Persyaratan Ujian</b> <i>Study and examination requirements and forms of examination</i></p>	<table border="1"> <thead> <tr> <th><b>Rencana Evaluasi</b></th> <th><b>Bobot Weight</b></th> </tr> </thead> <tbody> <tr> <td>Tugas 1 : Studi kasus <i>Assignment 1: Case Study</i></td> <td>15%</td> </tr> <tr> <td>Tugas 2: Proyek tim <i>Assignment 2: Team Project</i></td> <td>25%</td> </tr> <tr> <td>Presentasi hasil proyek <i>Project presentation</i></td> <td>10%</td> </tr> <tr> <td>Tugas 3: Studi kasus <i>Assignment 3: Case Study</i></td> <td>15%</td> </tr> <tr> <td>Tugas 4: Proyek tim <i>Assignment 4: Team Project</i></td> <td>25%</td> </tr> <tr> <td>Presentasi hasil proyek <i>Project presentation</i></td> <td>10%</td> </tr> </tbody> </table>	<b>Rencana Evaluasi</b>	<b>Bobot Weight</b>	Tugas 1 : Studi kasus <i>Assignment 1: Case Study</i>	15%	Tugas 2: Proyek tim <i>Assignment 2: Team Project</i>	25%	Presentasi hasil proyek <i>Project presentation</i>	10%	Tugas 3: Studi kasus <i>Assignment 3: Case Study</i>	15%	Tugas 4: Proyek tim <i>Assignment 4: Team Project</i>	25%	Presentasi hasil proyek <i>Project presentation</i>	10%
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<p><b>Media yang digunakan</b> <i>Media employed</i></p>	<p>Classical teaching tools with white board and power point presentation</p>														
<p><b>Daftar Pustaka</b> <i>Reading list</i></p>	<ol style="list-style-type: none"> <li>1. Turcotte, D. L and G. Schubert. 2002. <i>Geodynamics (2<sup>nd</sup> Ed)</i>. Cambridge University Press, Cambridge.</li> <li>2. Caspary, W.F. 1998. <i>Concepts of Network and Deformation Analysis</i>. Monograph 11, School of Surveying, The University of New South Wales.</li> <li>3. Smith, D. E and D.L. Turcotte. 2013. <i>Contribution of Space Geodesy to Geodynamics</i>. Published by the American Geophysical.</li> <li>4. Stacey, F. D and P.M. Davis. 2008. <i>Physics of the Earth (4<sup>th</sup> Ed)</i>. Cambridge University Press, New York.</li> </ol> <p>c. Segall, Paul. 2010. <i>Earthquake and Volcano Deformation</i>. Princenton University Press. Pricenton. New Jersey.</p>														