# PROGRAM PLAN AND SEMESTER LEARNING ACTIVITIES (RPKPS) SCHOOL YEAR 2021/2022

Geophysical Mechanics of

Continuous Medium

MFG2111/ 2 credits

Mentoring
Team:

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**GADJAH MADA UNIVERSITY**
**FACULTY OF MATHEMATICS**
**AND NATURAL SCIENCES**
**2021**

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| | **Gadjah Mada University**<br>Faculty of Mathematics and Natural Sciences<br>Department of Physics / S1 Geophysics Study<br>Program Academic Year 2021/2022 | **Document Code:**<br>..... |

## SEMESTER LEARNING PROGRAM AND ACTIVITY PLAN (RPKPS)

| Course Code | Course Name | Weight (credit) | | Semester | Course Status | Prerequisite Courses |
|---|---|---|---|---|---|---|
| *MFG2111* | *Mechanics of the Continuous Medium* | *T: 2* | *P:* | *Complete* | *Mandatory* | |

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|---|---|---|
| **Course Brief Description** | In this course students will understand tensor, stress and strain, stress and strain tensor, 3D stress – strain rotation, principal stress, principal value, kinematic deformation, green deformation tensor, langrangian finite tensor | |
| **Graduate Learning Outcomes (CPL) Charged to MK** | ***CPL-1*** | **Good Attitude**: Graduates are honest, disciplined, curious, critical, confident, independent, emotionally mature, cooperative, and trustworthy. Uphold norms, values, morals, religion, general ethics and professional ethics, and actively play a role in the global movement of sustainable development and behave professionally |
| | ***CPL-2*** | **Mastery of knowledge** : Graduates are able to apply basic science (mathematics, physics, chemistry, biology, geology), and geophysics in general and their relationship with other sciences such as geology, geodesy, geochemistry, geography, computing and information technology. |
| | ***CPL-3*** | **Operational and comprehensive skills**: Graduates are able to apply all geophysical methods (seismic, gravitational, magnetic, electrical, electromagnetic, and thermic methods) for energy exploration (e.g. oil and gas, coal, geothermal), mining materials (eg: iron, copper, gold, silver, tin) as well as groundwater and disaster mitigation |
| **Course Learning Outcomes (CPMK)** | **After completing the learning of this course, students are expected to be able to:** | |
| | ***CPMK-1*** | Students are able to understand the basic concepts of strain and stress tensor [CPL-2] [CPL-3] |
| | ***CPMK-2*** | Students are able to understand the concepts of principal stress and 3D stress rotation [CPL-1][CPL-2][CPL-3] |
| | ***CPMK-3*** | Students are able to understand kinematic deformation, lagrangian and green deformation analysis. [CPL-1] [CPL-2] [CPL-3] |

**CPL mapping with CPMK**

| | CPMK1 | CPMK2 | CPMK 3 |
|---|---|---|---|
| CPL-1 | | ✓ | ✓ |
| CPL-2 | ✓ | ✓ | ✓ |
| CPL-3 | ✓ | ✓ | ✓ |

| The Relationship of CPMK with Learning Materials and Forms, as well as Time Allocation | ***CPMK*** | **Learning Materials** | **Forms of Learning** | **Time Allocation** |
|---|---|---|---|---|
| | ***CPMK-1*** | Introduction to vectors and tensors | Lecture | 2 Hours |
| | ***CPMK-1*** | Stress tensor | Lecture + Quiz | 2 Hours |
| | ***CPMK-1*** | Stress rotation | Lecture | 2 Hours |
| | ***CPMK-2*** | 3D coordinate transformation | Lecture | 2 Hours |

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|---|---|---|---|---|
| | ***CPMK-2*** | Principal values | Lecture | 2 Hours |
| | ***CPMK-2*** | Tensor Fields | Lecture | 2 Hours |
| | ***CPMK-2*** | Tensor Calculus | Lecture | 2 Hours |
| | **UTS/Project Task Results/Case Analysis Results** | | | |
| | ***CPMK-2*** | Body and Surface Forces | Lecture | 2 Hours |
| | ***CPMK-2*** | Cauchy Stress | Lecture | 2 Hours |
| | ***CPMK-2*** | Stress transformation laws | Lecture | 2 Hours |
| | ***CPMK-2*** | *Principal stress* | Lecture | 2 Hours |
| | ***CPMK-2*** | Maximum and minimum stress value | Lecture | 2 Hours |
| | ***CPMK-2*** | Deviator and Spherical Stress | Lecture | 2 Hours |
| | **UAS/ Project Task Results/ Case Analysis** | | | |

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| **Learning Methods** | In this course there are 3 learning methods, namely presentations from lecturers, Student Based Learning and discussions |
| **Student Learning Experience** | Students actively discuss, listen and understand lecture materials given by lecturers, looking for literacy when *student-based learning*. |
| **Access Learning Media / LMS and Offline &; Online Percentage** | 100% offline |

**Assessment Methods and Alignment with CPMK**

| Assessment Techniques | Assessment Percentage | Criteria/ Indicators | CPMK-1 | CPMK-2 | CPMK-3 | | |
|---|---|---|---|---|---|---|---|
| **Participatory Activities**[*)] | | | | | | | |
| ***Project Results*/Case Study Results/PBL Results**[*)] | | | | | | | |
| **Cognitive** | | | | | | | |
| **Assignment** | **20** | Presentation liveliness | ✓ | ✓ | ✓ | | |
| **Quiz** | | | | | | | |
| **UTS** | **40** | | | ✓ | ✓ | | |
| **UAS** | **40** | | | ✓ | ✓ | | |
| **Total** | **100** | | | | | | |

<table>
<tr><td>Reference List</td><td colspan="4">1. Newman, W, I., 2012, Continuum Mechanics in the Earth Science.<br>2. Mase, G. E., 1999., Continuum Mechanics for Engineers, CRC Press LLC.</td></tr>
<tr><td>Name of Lecturer (Team Teaching)</td><td colspan="4">1. Dr. rer. Nat. Wiwit Suryanto, M Si.<br>2. Dr. rer. Nat. Herlan Darmawan, M.Sc</td></tr>
<tr><td rowspan="2">Authorization</td><td>Drafting Date</td><td>Course Coordinator</td><td>Coordinator of Expertise (if any)</td><td>Head of Study Program</td></tr>
<tr><td>03 September 2022</td><td>  </td><td></td><td>  <br>Dr.. Sudarmaji,MSi</td></tr>
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