ME3102 - Numerical Weather Prediction Method

<table>
<tr><td colspan="5">COURSE LESSON PLAN
STUDY PROGRAM: METEOROLOGY
FACULTY/SCHOOL: FACULTY OF EARTH SCIENCES AND TECHNOLOGY
INSTITUT TEKNOLOGI BANDUNG</td></tr>
<tr><td colspan="2">Course Code: ME3102</td><td>Credits: 3</td><td>Semester: 5</td><td>Course Type: Compulsory course</td></tr>
<tr><td colspan="2" rowspan="2">Course Name</td><td colspan="3">Metode Prediksi Cuaca Numerik</td></tr>
<tr><td colspan="3">Numerical Weather Prediction Method</td></tr>
<tr><td colspan="2">Related Course</td><td>ME2202</td><td>Metode Numerik Meteorologi</td><td>Pre-requisite</td></tr>
<tr><td colspan="2" rowspan="4">Study Materials</td><td colspan="2">Characteristics of the governing equations of atmospheric motion in partial differential equation form.</td><td>Expose</td></tr>
<tr><td colspan="2">Principles of the finite difference method for solving atmospheric model equations, including numerical differentiation schemes and time integration.</td><td>Expose</td></tr>
<tr><td colspan="2">Numerical instability; the finite difference method applied to solve the barotropic atmospheric model equations, the simplest atmospheric model.</td><td>Explore</td></tr>
<tr><td colspan="2">Spectral models commonly used as global atmospheric models (GCMs and global NWP models); method also applied to obtain numerical solutions for barotropic model equations on a global domain.</td><td>Explore</td></tr>
<tr><td colspan="5">Learning Outcomes</td></tr>
<tr><td colspan="2">Code</td><td colspan="3">LO</td></tr>
<tr><td colspan="2">PLO-3.2</td><td colspan="3">Able to process large-scale digital weather and climate data to understand weather and climate phenomena. (C3)</td></tr>
<tr><td colspan="2">PLO-3.3</td><td colspan="3">Able to operate computing devices in accordance with the learned algorithms to solve standard scientific problems in meteorology. (C3)</td></tr>
<tr><td colspan="2">PLO-4.1</td><td colspan="3">Able to design a simulation of a weather system and/or its environmental interactions for the application of meteorological knowledge. (C3)</td></tr>
<tr><td>Code</td><td>CO</td><td colspan="3">Elements of Course Learning Outcomes (CO)</td></tr>
<tr><td>PLO-3.2</td><td>1</td><td colspan="3">Students are able to translate mathematical model equations into programming code using the finite difference method and process the model outputs as digital data. (C3)</td></tr>
<tr><td>PLO-3.3</td><td>2</td><td colspan="3">Students are able to run programming code developed to solve advection and barotropic atmosphere model problems. (C3)</td></tr>
<tr><td>PLO-4.1</td><td>3</td><td colspan="3">Students are able to design a barotropic atmosphere simulation using finite difference and spectral methods. (C3)</td></tr>
<tr><td colspan="2">Learning Methods</td><td colspan="3">Lecture
Group Discussion
Cooperative Learning
Problem-based Learning</td></tr>
<tr><td colspan="2">Learning Modalities</td><td colspan="3">Synchronous learning
Blended/Online Asynchronous</td></tr>
<tr><td colspan="2">Assessment Method</td><td colspan="3">Assessment components: Midterm Examination (30%), Final Examination (30%), Laboratory/Practicum (30%), Assignments (5%), and Quizzes (5%). Grading Scale: 80–100% A (maximum competency) 75–80% AB (very good competency) 65–75% B (good competency) 60–65% BC (satisfactory competency) 55–60% C (minimum competency) 45–54% D (below minimum competency) <45% E (far below minimum competency)</td></tr>
</table>