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Bachelor in Electronics and Instrumentation

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MODULE HANDBOOK

Module name	Deep Learning
Module level	Undergraduate
Code	MII 3401
Courses	Deep Learning
Semester(s) in which the module is taught	Even Semester
Person responsible for the module	Ika Candradewi, S.Si., M.Cs.
Lecturer(s)	Afiahayati, M.Cs., Ph.D Ika Candradewi, S.Si., M.Cs.
Language	English Bahasa Indonesia
Relation to curriculum	1. Undergraduate degree program, elective, 6th semester. 2. International undergraduate program, elective, 6th semester.
Teaching methods	SCL (Student Centre Learning) with team based project When Synchronized: actively discussing material and cases. When Asynchronous/Standalone/Structured Assignments: • group study • take quizzes • reflection of material (using E-Lok Wiki) • reviewing literature and problems in the community • work on project ideas in a multidisciplinary manner
Workload (incl. contact hours, self-study hours)	1. Lectures: 3 x 50 = 150 minutes per week. 2. Exercises and Assignments: 2 x 50 = 100 minutes per week. 3. Self-study: 1 x 50 = 50 minutes per week.
Credit points	3 Credit Points
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Required and recommended prerequisites for joining the module	Students must complete Machine Learning course (MII21- 2402)

<table>
<tr><td>Learning outcomes and their corresponding PLOs</td><td>After completing this module, a student is expected to:
CO1. Able to differentiate Deep Learning to traditional Neural Network. [CPL 2]
CO2. Able to understand multi-layer perceptron and backpropagation [CPL 2]
CO3. Able to understand components in DNN architecture such as softmax, cross entropy loss function, activation function [CPL 2][CPL 3]
CO4. Able to understand computation process in DNN including batch normalization, hyperparameter initialization,etc. [CPL 2][CPL 3][CPL 4]
CO5. Able to understand DNN architectures including CNN (modern/traditional) and RNN/LSTM/GRU.[CPL 2] [CPL 3][CPL 4]
CO6. Able to implement Deep Learning algorithms for specific problem. [CPL 2] [CPL 3][CPL 4][CPL 5]

<table>
<tr><th colspan="2">PLO</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th><th>CO6</th></tr>
<tr><td rowspan="5">Program Learning Outcome (PLO)</td><td>PLO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>PLO2</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO3</td><td></td><td></td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO4</td><td></td><td></td><td></td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO5</td><td></td><td></td><td></td><td></td><td></td><td>√</td></tr>
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<tr><td>Content</td><td>1. Introduction and the differences between Deep Learning and traditional NN
2. Multi-Layer Perceptron, backpropagation
3. Components in Deep Neural Network including softmax, cross entropy loss function, activation function
4. Computation process in Deep Learning including batch normalization, layer and block, hyperparameter, initialization
5. Traditional CNN (AlexNet) dan Modern CNN (GoogleNet, Inception)
6. Recurrent Neural Network (RNN), Gate Recurrent Unit (GRU), Long Short-Term Memory
7. Application of the DNN algorithm to solve problems</td></tr>
<tr><td>Study and examination requirements and examination forms</td><td>The evaluation is done in Five forms, namely:
1. Final exam
2. Midterm exam
3. Individual Case based Project
4. Two group assignments to be completed within a certain timeframe, and Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</td></tr>
<tr><td>Media employed</td><td>e-learning Platform (ELOK), projector, whiteboard, website, and presentation.</td></tr>
<tr><td>Assessments and evaluation</td><td>
<table>
<tr><th>Type</th><th>Percentage</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th><th>CO6</th></tr>
<tr><td>Individual Final Project /Case Study</td><td>20%</td><td></td><td></td><td></td><td></td><td></td><td>√</td></tr>
<tr><td>Task 1</td><td>5%</td><td></td><td>√</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Group Task 1</td><td>10%</td><td></td><td></td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>Midterm Exam</td><td>20 %</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
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</td></tr>
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	Task 2	**5 %**				**√**		**√**
	Task 3	**5 %**					**√**	**√**
	Group Task 2	**10 %**						**√**
	Final Exam	**25 %**				**√**	**√**	
	Total	**100 %**						
Reading list	Goodfellow, I., Bengio, Y., dan Courville, A., 2016, Deep Learning, MIT Press, US							

Created date **:** January 11st, 2022

Revision date **:**