UNIVERSITAS MATARAM

(University of Mataram)

FAKULTAS TEKNIK

(Faculty of Engineering)

PROGRAM STUDI TEKNIK INFORMATIKA

(Bachelor of Informatics Engineering)

MODULE HANDBOOK DESCRIPTION

Module designation	Natural Language Processing (P22A06)	
Semester(s) in which the module is taught	*6 / third year*	
Person responsible for the module	*Dr. Eng. Budi Irmawati*	
Language	*Indonesian*	
Relation to curriculum	*Elective*	
Teaching methods	*simulation, group discussions and presentation, case-based problems, lectures*	
Workload (incl. contact hours, self-study hours)	Contact hours every week, each week of the 16 weeks/semester including Evaluation • 2 x 50 minutes lecturer/week • 2 x 60 minutes class exercise/week • Self-study hours = 120 minutes/week Total workload 340 minutes/week	
Credit points	*2 (~ 3.2 ECTS)*	
Required and recommended prerequisites for joining the module	Discrete Mathematics, Basic programming skills (preferably in Python), Fundamental knowledge of probability and statistics, Understanding of linear algebra concepts **Recommended Prerequisites**: Prior coursework in machine learning or data science, Familiarity with algorithm design and computational complexity	
Module objectives/ intended learning outcomes	1. Students are able use regular expression, normalize data, and calculate distance	PLO6: 20%
	2. Students are able to implement language model, PoS Tagging, and optionally vector embeddings.	PLO7: 30%

	3. Students are able to implement a parsing algorithm.	PLO8: 25%
	4. Students are able to classify, clustering data and implement machine translation	PLO8: 25%
Content	**Natural Language Processing** enable machines to interpret, understand, and generate human language in a meaningful way, explores methods to extract information from raw texts and combining additional data extracted as well from the structure of the texts (such as bag of word, language model, PoS tagging, dependency relation, and parsing). The lessons are mostly given in group discussion as case based problems and in practical works. At the end of the course, students are required to apply algorithms and models to extract insights, understand context, and perform tasks such as translation or sentiment detection. It's an interdisciplinary field that leverages linguistics, computer science, and statistics to make sense of language. The course target is students have basic abilities with any text processing techniques (cleaning, stemming, regular expression, feature extraction, embedings, etc.) to work on computational linguistics tasks like sentiment analysis, paraphrasing, summarization, machine translation, language generation, etc. Parsing and syntactic analysis, Semantic analysis (deriving meaning from text), Named entity recognition, sentiment analysis, machine translation, and using machine learning and deep learning models for language tasks	
Examination forms	*Assignments, Quiz, Simulation, Problem solving*	
Study and examination requirements	***Coursework (40%):*** *Regular assignments and lab exercises focused on practical programming and problem-solving in NLP.* ***Group Project (30%):*** *A comprehensive project where students design, develop, and present an NLP solution addressing a real-world problem. Emphasis on innovation, collaboration, and technical execution.* ***Final Examination (30%):*** *A combination of written and practical assessments testing theoretical understanding and applied skills. Clear, direct questions that require both conceptual explanations and coding proficiency.*	

Reading list	1. Steven Bird, Ewan Klein, and Edward Loper, Natural Language Processing with Python, 2015. https://www.nltk.org/book/ 2. Daniel Jurafsky & James H. Martin, Speech and Language Processing 2nd Edition: An introduction to natural language processing, computational linguistics, and speech recognition, 2006. https://www.cs.colorado.edu/~martin/slp.html 3. NLP 100 Exercise 2020 (Rev 1) 4. SRILM - The SRI Language Modeling Toolkit 5. Moses 6. GiZA++ **Recommended Reading:** 1. Manning, C.D. & Schütze, H. *Foundations of Statistical Natural Language Processing* 2. Goldberg, Y. *Neural Network Methods for Natural Language Processing* 3. Selected papers from leading conferences (e.g., ACL, EMNLP) to understand current research trends