

Course Code	TKIE161105
Course Name	Algorithms and Data Structures
Course Instructors	Teguh Bharata Aji; Adhistya Erna Permanasari; Indriana Hidayah; Silmi Fauziati
Course Type	Required
Course Classification	Engineering Topics
Credit / Contact Hour per Week	3 / 150 minutes per Week
Course Description	Students can understand, analyse and implement algorithmic techniques and data structure in programming including searching algorithm, sorting algorithm and various data structures.
Prerequisites Courses	-
<b>Covered Student Outcome</b>	<b>Fundamental Engineering Knowledge (a)</b> <b>Development of Engineering Solution (b)</b> <b>Modern Tools Utilization (e)</b>

Learning Mapping		
Code	Learning Outcome	Student Outcome
LO1	Students can explain the initial overview of algorithms and data structures.	Fundamental and Engineering Knowledge (a)
LO2	Students can explain and implement algorithm understanding, algorithm requirements, and different iterations and recursion.	Fundamental and Engineering Knowledge (a)
LO3	Students can explain and implement data representation, make data declarations on various data types, variables and Abstract Data Type (ADT).	Development of Engineering Solution (b)
LO4	Students can explain and implement operation of the data structure of the stack, queue, list, and data tree.	Development of Engineering Solution (b)
LO5	Students can explain and implement various data sorting and searching algorithm.	Modern Tools Utilization (e)
LO6	Students can explain and implement graph data structure.	Modern Tools Utilization (e)

Topic	<ol style="list-style-type: none"> <li>1. Preliminary</li> <li>2. Programming Technique</li> <li>3. Data Structures and Abstract Data Type (ADT)</li> <li>4. Stacks</li> <li>5. Queue</li> <li>6. List Structure</li> <li>7. Tree Structure</li> <li>8. Data Sorting</li> <li>9. Data Searching</li> <li>10. Graph Data Structure</li> </ol>											
Direct Assessment	<table border="1"> <thead> <tr> <th>Direct Assessment Plan</th> <th>Measured Learning Outcome</th> </tr> </thead> <tbody> <tr> <td>Mid Exam</td> <td>LO1, LO2, LO3</td> </tr> <tr> <td>Final Exam</td> <td>LO4, LO5, LO6</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>		Direct Assessment Plan	Measured Learning Outcome	Mid Exam	LO1, LO2, LO3	Final Exam	LO4, LO5, LO6				
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Mid Exam	LO1, LO2, LO3											
Final Exam	LO4, LO5, LO6											
Indirect Assessment	Questionnaire and direct communication											
References	<p>[1] McMillan, M : Data Structures and Algorithms Using C#, Cambridge University Press, 2007</p> <p>[2] Mehta, D.P and Sahni, S:Handbook of DATA STRUCTURES and APPLICATIONS, Chapman &amp; Hall/CRC Computer and Information Science Series, 2005</p> <p>[3] Internet materials related to Data Structures and Algorithms</p>											