



**UNIVERSITAS INDONESIA**  
Faculty of Mathematics and Natural Sciences  
Department of Mathematics  
Building D, Kampus UI Depok 16424, Telp: 021 - 7863439,  
Email: sekretariat.math@sci.ui.ac.id, website: <https://www.math.ui.ac.id/>

### MODULE HANDBOOK

Module designation	<i>Parallel Computing</i>
Semester(s) in which the module is taught	6
Person responsible for the module	<i>Module Coordinator</i>
Language	<i>Indonesian</i>
Relation to curriculum	<i>Elective</i>
Teaching methods	<i>Lecture, lab works</i>
Workload (incl. contact hours, self-study hours)	<i>(Estimated) Total workload: 8.5 hours x 14 weeks + 3 hours x 2 weeks</i> <i>Contact hours: 150 minutes lectures, 180 minutes structured activities, and 180 minutes individual study per week</i> <i>Private study including examination preparation, specified in hours<sup>1</sup>:</i>
Credit points	3 SKS (4.77 ECTS)
Required and recommended prerequisites for joining the module	<i>Algorithm and Programming</i>
Module objectives/intended learning outcomes	<i>After completing the course, students have the ability</i> <ol style="list-style-type: none"><li>1. <i>distinguishing parallel and sequential algorithms</i></li><li>2. <i>distinguishing parallel computing architecture</i></li><li>3. <i>compiling parallel algorithm</i></li><li>4. <i>to analyze the performance of parallel algorithms</i></li><li>5. <i>processing big data</i></li><li>6. <i>designing parallel computing on big data</i></li></ol>

---

<sup>1</sup> When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Content	<ol style="list-style-type: none"> <li>1. <i>Sequential and Parallel Algorithm</i></li> <li>2. <i>Parallel computing architecture (shared, distributed, and hybrid computing)</i></li> <li>3. <i>Parallel Algorithm Analysis</i></li> <li>4. <i>Parallel Algorithm Model</i></li> <li>5. <i>Parallel Algorithm Structure</i></li> <li>6. <i>Design Techniques</i></li> <li>7. <i>Big Data</i></li> <li>8. <i>Parallel Implementation on Big Data</i></li> </ol>																				
Examination forms	<ol style="list-style-type: none"> <li>1. <i>Class activities : Assignment</i></li> <li>2. <i>Mid-term examination</i></li> <li>3. <i>Final examinations</i></li> </ol>																				
Study and examination requirements	<p><i>The final mark will be weighted as follows:</i></p> <ol style="list-style-type: none"> <li>1. <i>Class activities : Assignment (20%)</i></li> <li>2. <i>Mid-term examination (30%)</i></li> <li>3. <i>Use-case group project (20%)</i></li> <li>4. <i>Final examination (30%)</i></li> </ol> <p><i>To successfully pass the module it requires a minimum 55% of the total mark.</i></p> <table data-bbox="628 1160 997 1646"> <thead> <tr> <th><i>Mark</i></th> <th><i>Grade</i></th> </tr> </thead> <tbody> <tr> <td>85 – 100</td> <td>A</td> </tr> <tr> <td>80 – &lt;85</td> <td>A-</td> </tr> <tr> <td>75 – &lt;80</td> <td>B+</td> </tr> <tr> <td>70 – &lt;75</td> <td>B</td> </tr> <tr> <td>65 – &lt;70</td> <td>B-</td> </tr> <tr> <td>60 – &lt;65</td> <td>C+</td> </tr> <tr> <td>55 – &lt;60</td> <td>C</td> </tr> <tr> <td>40 – &lt;55</td> <td>D</td> </tr> <tr> <td>&lt;40</td> <td>E</td> </tr> </tbody> </table>	<i>Mark</i>	<i>Grade</i>	85 – 100	A	80 – <85	A-	75 – <80	B+	70 – <75	B	65 – <70	B-	60 – <65	C+	55 – <60	C	40 – <55	D	<40	E
<i>Mark</i>	<i>Grade</i>																				
85 – 100	A																				
80 – <85	A-																				
75 – <80	B+																				
70 – <75	B																				
65 – <70	B-																				
60 – <65	C+																				
55 – <60	C																				
40 – <55	D																				
<40	E																				

Reading list	<ol style="list-style-type: none"><li>1. <i>Fundamentals of Sequential and Parallel Algorithms</i>, Kenneth A. Berman, Jerome L. Paul, ITP, 1997.</li><li>2. <i>The Design and Analysis of Parallel Algorithms</i>, Selim G. Akl, Prentice-Hall, 1989.</li><li>3. <i>Python Parallel Programming Cookbook</i>, Giancarlo Zaccone, 2nd Ed, 2019.</li><li>4. <i>Parallel Computing for data science with examples in R, C++ and CUDA</i>, Norman Matloff, CRC Press, 2016.</li></ol>
--------------	--