



# UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Mathematics

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## Doctor in Mathematics

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## MODULE HANDBOOK

|   |   |
|---|---|
| Module Name   | <i>Topics in Boundary Element Method</i>  |
| Module level, if applicable                                   |   |
| Code, if applicable   | <i>MMM 7601</i>   |
| Subtitle, if applicable                                       |   |
| Courses, if applicable  | <i>Topics in Boundary Element Method</i>  |
| Semester(s) in which the module is taught                     |   |
| Person responsible for the module                             | <i>Prof. Imam Solekudin, M.Si., Ph.D.</i>   |
| Lecturer(s)   | <i>Prof. Imam Solekudin, M.Si., Ph.D.</i>   |
| Language  | <i>Bahasa Indonesia</i>   |
| Relation to curriculum  | <i>elective</i>   |
| Teaching methods  | <i>lecture, project, seminar</i>  |
| Workload (incl. contact hours, self-study hours)              | <ul style="list-style-type: none"><li>• <i>3x50 minutes lectures,</i></li><li>• <i>3x50 minutes structured activities,</i></li><li>• <i>3x50 minutes individual study,</i></li><li>• <i>In 16 weeks per semester (including mid-term and final examinations).</i></li></ul> <i>Total: 144x50 minutes per semester</i> |
| Credit points   | <i>3</i>  |
| Required and recommended prerequisites for joining the module | <i>Before taking this course, students are expected to have learned differential equations and coding.</i>  |

| Module objectives/intended learning outcomes | <p><i>After completing this course, the students should have able to:</i></p> <ul style="list-style-type: none"> <li>• CO 1 derive boundary element method for modified Helmholtz equation.</li> <li>• CO 2 derive boundary element method for diffusion-convection equation.</li> <li>• CO 3 develop boundary element method for equations related to student's research.</li> </ul>  |            |           |                   |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
|--|--|------------|-----------|-------------------|--|----|-------------------|--------|-----------|-------------------|----|-------------------|----|----|----|----|----------------------|----|----|----|----|------------|----|--|----|----|----------------|----|----|---|--|--------------|------------|-----------|-----------|
| Content                                      | <p><i>In this course, students have to do activities under Lecture's supervision. Academic activities including literature study to master one or more concepts including: Boundary element method for modified Helmholtz equation, Boundary element method for diffusion-convection equation.</i></p>   |            |           |                   |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| Examination forms                            | <p><i>oral presentation, essay.</i></p>  |            |           |                   |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| Study and examination requirements           | <p><i>To pass this course, students must obtain a minimum grade of D. The final mark will be weighted as follows:</i></p> <table border="1"> <thead> <tr> <th>No</th> <th>Assessment method</th> <th>Weight</th> <th>Cognitive</th> <th>Project/Case base</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Final Examination</td> <td>30</td> <td>12</td> <td>18</td> </tr> <tr> <td>2.</td> <td>Mid-Term Examination</td> <td>30</td> <td>18</td> <td>12</td> </tr> <tr> <td>3.</td> <td>Laboratory</td> <td>25</td> <td></td> <td>25</td> </tr> <tr> <td>4.</td> <td>Quiz, Homework</td> <td>15</td> <td>10</td> <td>5</td> </tr> <tr> <td></td> <td><b>TOTAL</b></td> <td><b>100</b></td> <td><b>40</b></td> <td><b>60</b></td> </tr> </tbody> </table> |            |           |                   |  | No | Assessment method | Weight | Cognitive | Project/Case base | 1. | Final Examination | 30 | 12 | 18 | 2. | Mid-Term Examination | 30 | 18 | 12 | 3. | Laboratory | 25 |  | 25 | 4. | Quiz, Homework | 15 | 10 | 5 |  | <b>TOTAL</b> | <b>100</b> | <b>40</b> | <b>60</b> |
| No   | Assessment method  | Weight     | Cognitive | Project/Case base |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| 1.   | Final Examination  | 30         | 12        | 18                |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| 2.   | Mid-Term Examination   | 30         | 18        | 12                |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| 3.   | Laboratory   | 25         |           | 25                |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| 4.   | Quiz, Homework   | 15         | 10        | 5                 |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
|  | <b>TOTAL</b>   | <b>100</b> | <b>40</b> | <b>60</b>         |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| Media employed                               | <p><i>Board, LCD Projector, Laptop/ Computer</i></p>   |            |           |                   |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |
| Reading list                                 | <ol style="list-style-type: none"> <li>1. Ang, W. T., 2007, <i>A Beginner's Course in Boundary Element Methods</i>, Universal Publishers, Boca Raton, Florida.</li> <li>2. Pertridge, P.W., Brebbia, C.A., Wrobel, L.C., 1991, <i>Dual Reciprocity Boundary Element Method</i>, Springer.</li> <li>3. Katsikadelis, J. T., 2002, <i>Boundary Elements: Theory and Applications</i>, Elsevier, London.</li> <li>4. <i>Selected papers.</i></li> </ol>   |            |           |                   |  |    |                   |        |           |                   |    |                   |    |    |    |    |                      |    |    |    |    |            |    |  |    |    |                |    |    |   |  |              |            |           |           |

#### CO-PLO Mapping

|      | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 |
|------|-------|-------|-------|-------|-------|-------|
| CO 1 | v     | v     | v     |       |       | v     |
| CO 2 | v     | v     | v     |       |       | v     |
| CO 3 | v     | v     | v     |       | v     | v     |

Compilation Date :

Modified Date :