



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

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MODULE HANDBOOK

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| Module name | Integral and Differential Equations |
| Module level | Undergraduate |
| Code | MII-3406 |
| Courses (if applicable) | |
| Semester | Fall (Odd) |
| Contact person | Retantyo Wardoyo |
| Lecturer | 1. Drs. Retantyo Wardoyo, M. Sc.. Ph. D. 2. Dr. Nur Rokhman, S.Si., M.Kom 3. Moh. Edi Wibowo, S.Kom., M.Kom., Ph.D. |
| Language | Bahasa Indonesia & English |
| Relation to curriculum | 1. Undergraduate degree program, compulsory, 2,4,6th semester. 2. International undergraduate program, compulsory, 2,4,6th semester. |
| Type of teaching, contact hours | 1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students. |
| Workload | 1. Lectures: 2 x 60 = 120 minutes per week. 2. Exercises and Assignments: as scheduled 3. Private study: 1 x 30 = 30 minutes per week. |
| Credit points | 3 credit points (sks). |
| Requirements according to the Examination regulations | - |
| Recommended prerequisites | Calculus I |
| Learning outcomes (course outcomes) and their corresponding PLOs | After completing this module, a student is expected to: CO1. Students can apply basic formulas and properties of indefinite integrals CO2. Students can apply integrals by parts, integrals of transcendent functions, and integrals with variable substitution CO3. Students can apply definite integrals. CO4. Students can solve differential equations of order 1: homogeneous, exact CO5. Students can solve differential equations of order 1: with integral factors, PD Bernoulli. |

| | <p>CO6 Students can solve second-order differential equations: homogeneous, non-homogeneous with indeterminate functions, and parameter variations</p> <p>CO7 Students can solve differential equations with the Laplace transform</p> <table border="1"> <thead> <tr> <th colspan="2">PLO</th> <th>CO1</th> <th>CO2</th> <th>CO3</th> <th>CO4</th> <th>CO5</th> <th>CO6</th> <th>CO7</th> </tr> </thead> <tbody> <tr> <td>Program</td> <td>PLO1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning</td> <td>PLO2</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Outcome</td> <td>PLO3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>(PLO)</td> <td>PLO4</td> <td></td> <td></td> <td></td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td></td> <td>PLO5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | PLO | | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | CO7 | Program | PLO1 | | | | | | | | Learning | PLO2 | √ | √ | √ | | | | | Outcome | PLO3 | √ | √ | √ | √ | √ | √ | √ | (PLO) | PLO4 | | | | √ | √ | √ | √ | | PLO5 | | | | | | | |
|---|---|------|------------|-----|-----|-----|-----|-----|-----|-----|-------------------|------|---|---|---|--|--|--|--|--------------|------|---|---|---|--|--|--|--|-------------------|------|---|---|---|---|---|---|---|------------|------|--|--|--|---|---|---|---|-------|------|--|--|--|--|--|--|--|
| PLO | | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | CO7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Program | PLO1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Learning | PLO2 | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outcome | PLO3 | √ | √ | √ | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (PLO) | PLO4 | | | | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | PLO5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contents | <ol style="list-style-type: none"> Integral tak tentu: sifat-sifat, rumus dasar Integral per bagian Integral fungsi trigonometri Integral fungsi Pecah rasional Substitusi variabel Integral tertentu Classification of DEs (ordinary/partial, first/second/third ... order, linear/non-linear, homogeneous/non-homogeneous), boundary values First-order linear ODE and integrating factor General theory of higher order ODE Second order linear ODE with constant coefficients, homogenous and non hom Variation of parameters & undetermined coefficients Laplace transform | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Study and examination requirements and forms of examination | <p>The evaluation is done in 3 forms, namely:</p> <ol style="list-style-type: none"> Trial, either midterm or semester test, Three individual assignment <p>Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media employed | e-learning Platform (eLOK), LCD, whiteboard, and websites. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assessments and Evaluation | <table border="1"> <thead> <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> <th>CO7</th> </tr> </thead> <tbody> <tr> <td>Individual Task 1</td> <td>15</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Midterm Exam</td> <td>30</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Individual Task 2</td> <td>20</td> <td></td> <td></td> <td></td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Final Exam</td> <td>35</td> <td></td> <td></td> <td></td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Type | Percentage | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | CO7 | Individual Task 1 | 15 | √ | √ | √ | | | | | Midterm Exam | 30 | √ | √ | √ | | | | | Individual Task 2 | 20 | | | | √ | √ | √ | √ | Final Exam | 35 | | | | √ | √ | √ | √ | Total | 100 | | | | | | | |
| Type | Percentage | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | CO7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Individual Task 1 | 15 | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Midterm Exam | 30 | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Individual Task 2 | 20 | | | | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Final Exam | 35 | | | | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reading List | <ol style="list-style-type: none"> Robert A. Adam and Christopher Essex, 2010, Calculus, A Complete Course, Pearson. Tim Pengajar Kalkulus, Diktat Kuliah Kalkulus II, FMIPA UGM Shepley L. Ross, Differential Equations, 1984, J. Willey, New York. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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