



**UNIVERSITAS INDONESIA**  
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### MODULE HANDBOOK

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|---|--|
| Module designation  | <i>Numerical Methods</i>   |
| Semester(s) in which the module is taught                     | 2  |
| Person responsible for the module                             | <i>Gatot F. Hertono</i>  |
| Language  | <i>Indonesian</i>  |
| Relation to curriculum  | <i>Compulsory</i><br><i>The module is shared with the Statistics, Actuarial Science undergraduate study programs</i>   |
| Teaching methods  | <i>Flipped learning and computer lab works</i>   |
| Workload (incl. contact hours, self-study hours)              | <i>(Estimated) Total workload: 9 hours/week x 14 weeks + 5.5 hours/week x 2 weeks = 137 hours.</i><br><i>Contact hours: 150 minutes lectures.</i><br><i>Individual study including examination preparation, specified in hours:</i><br><i>3 hours structured learning and 3 hours individual study per week.</i> |
| Credit points   | 3 SKS (4.77 ECTS)  |
| Required and recommended prerequisites for joining the module | <i>Introduction to Data Science, Calculus 1</i>  |
| Module objectives/intended learning outcomes                  | <i>After completing this course, students are able to solve mathematic problems numerically. Students also gain learning experience in each several numerical methods in the form of numerical simulations through computer programming.</i>   |

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| Content                            | <ol style="list-style-type: none"> <li>1. <i>Number representation, error analysis, and algorithms,</i></li> <li>2. <i>Solution of one-variable equation,</i></li> <li>3. <i>Interpolation and polynomial approximation,</i></li> <li>4. <i>Numerical Differentiation,</i></li> <li>5. <i>Numerical Integration,</i></li> <li>6. <i>Direct method for solving a system of linear equations,</i></li> <li>7. <i>Iterative method to solve a system of linear equations.</i></li> </ol> |
| Examination forms                  | <i>Essay</i>  |
| Study and examination requirements | <p><i>Requirements for successfully passing the module:</i></p> <p><i>Individual assignment and lab works (30%), midterm exam (35%), final exam (35%)</i></p>   |
| Reading list                       | <p><i>Compulsory:</i></p> <p><i>[1] Burden, R.L., Numerical Analysis (9th International Edition), 2011, Canada: Wadsworth, Brooks/Cole, Cengage Learning.</i></p> <p><i>Optional:</i></p> <p><i>[2] Atkinson K. dan Han W., Elementary Numerical Analysis, 3rd Ed, 2004, John Wiley &amp; Sons, Inc.</i></p> <p><i>[3] Golub, G. H. dan Loan, C.F.V., Matrix Computations, 4th Ed., 1995, The John Hopkin University Press</i></p>  |