**MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY**
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
UNDERGRADUATE PROGRAM OF MATHEMATICS
Ketintang Campus, C8-C9 Buildings of FMIPA, Surabaya
Email: s1-mat@unesa.ac.id

# Module Handbook

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| Module Name : | *Analisis Numerik*<br>Numerical Analysis |
| Module level : | Bachelor degree/Undergraduate Program |
| Course Code : | 4420103016 |
| Abbreviation, if applicable: | - |
| Courses included in the module, if applicable: | Not Applicable |
| Semester/Term | 6th/ third year |
| Module coordinator(s) | Dr. Yusuf Fuad, M.App. Sc |
| Lecturer(s): | Dr. Yusuf Fuad, M.App. Sc<br>Dr. Dian Savitri, M.Si<br>Dimas Avian Maulana, M.Si. |
| Language: | Bahasa Indonesia (Indonesian Language) |
| Classification within the curriculum: | ~~Compulsory~~/ Elective |
| Teaching format/class hours per week during the semester: | 3 contact hours of lectures (*sks* or credit unit*) |
| Workload : | 3 x 50 minutes lectures, 3 x 60 minutes structured activity, and 3 x 60 minutes individual activity per week,<br>14 weeks per semester<br>119 total hours per semester ~ 4.77 ECTS** |
| Credit Unit: | 3 credit unit (4.77 ECTS) |
| Requirements: | Integral Calculus, Numerical Method, Ordinary Differential Equations, Partial Differential Equation. |

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| Learning goals/competencies: | **Knowledge**<br>**KNO-2**: Formulate problems related to solution of ordinary differential equations and partial differential equation, as well as a find alternatif solution using the finite element method.<br><br>**Skill**<br>**SKI-2**: Implement basic principles of numerical analysis to solve simple mathematics problems with a numerical approach and its application<br><br>**SKI-4:** Solving of numerical analysis problem using computation (ex. Matlab, Python, Mathematica, Java, etc) |
| Content | This course discusses mathematical calculations through the principles of solving Ordinary Differential Equations, Parsial Differential Equation, and translating the finite element method through order research to find clues. Determine and select various alternative solutions to the problems given. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations. |

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| Attribute Soft skill: | Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class. |
| Study/exam achievements: | The final grade (*NA*) is calculated based on the following ratio: |

| Assessment Components | Percentage of contribution |
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| Participation | 20% |
| Assignment | 30% |
| Mid-semester test | 20% |
| Final semester test | 30% |

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<table>
<tr><td></td><td>Grade conversion of 0-100 scale into 0-4 scale is set as below:
<table>
<tr><th>Letter</th><th>Number</th><th>Grade Interval</th></tr>
<tr><td>A</td><td>4,00</td><td>85 ≤ A ≤ 100</td></tr>
<tr><td>A-</td><td>3,75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3,50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
</table></td></tr>
<tr><td>Learning Methods :</td><td>Student-centered approach; project-based learning; lecturer and discussion; and presentations (structured activities)</td></tr>
<tr><td>Form of Media:</td><td>Power point slides; video; worksheets, and textbooks</td></tr>
<tr><td>Literature (primary references):</td><td>1. Atkinson, K. 2003. Elementary Numerical Analysis3rd Edition, John Wiley and Sons.<br>2. Burden, R.L. & Faires, J.D. 1989. Numerical analysis, Fourth Edition. New York. PWS-KENT Publising Company<br>3. Gerald, C.F. and Weatley, P.O. 1984. Applied Numerical Analysis. Addison Wesley.. Springer Netherlands.<br>4. Patel, Vithal A., 1994. Numerical Analysis. Harcourt Brace College Publishers. Fort Worth.</td></tr>
<tr><td>Notes:</td><td>*1 credit unit or sks in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research,<br>Technology, and Higher Education No. 50 Year 2018.</td></tr>
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| | **1 credit unit or *sks* = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019 |