



MINISTRY OF EDUCATION, CULTURE, RESEARCH,
AND TECHNOLOGY

UNIVERSITAS NEGERI SURABAYA

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

Ketintang Campus, D-1 Building, Surabaya 60231 +6231-8296427

Website: www.fmipa.unesa.ac.id, email: info_fmipa@unesa.ac.id

Master Program of Mathematics Education

Module Handbook

Module Name:	Numerical Methods
Module Level:	Master (S-2)
Abbreviation, if applicable:	
Sub-heading, if applicable:	-
Course included in the module, if applicable:	-
Semester/term:	3/Second year
Module Coordinator(s):	Dr. Yusuf Fuad, M.App. Sc.
Lecturer(s):	Dr. Yusuf Fuad, M.App. Sc.
Language:	Indonesian
Classification within the curriculum:	Compulsory course /elective studies
Teaching format/class hours per week during the semester	Teaching format: lectures, tutorial assignment, and individual study. 2 × 240 minutes = 480 minutes = 8 hours lectures
Workload:	15 weeks per semester consisting of: <ul style="list-style-type: none"> • 1 hour lecture (1 × 50 minutes) per week, • 2 hours assignments (2 × 45 minutes) per week, • 2 hours individual study (2 × 50 minutes) per week, Total workload: 14 × 2 × 240 minutes = 6,720 minutes ≈ 4.48 ECTS*
Credit Point:	2
Requirements:	N/A
Learning Goals :	<p>KNOWLEDGE (KNO-1)</p> <p>CLO-1: able to demonstrate mathematical knowledge and insight for solving simple mathematical problems with numerical approaches related to sources of errors, the concept of precision accuracy, approximation of the roots of non-linear equations, polynomial interpolation, numerical derivatives and numerical integral.</p> <p>SKILL (KNO-1)</p> <p>CLO-2: able to formulate problems related to sources of errors, the concept of precision accuracy, approximation of the roots of non-</p>



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	<p>linear equations, polynomial interpolation, numerical derivatives and numerical integral.</p> <p>CLO-3: able to implement of mathematical numerical approaches related to approximation of the roots of non-linear equations, polynomial interpolation, numerical derivatives and numerical integral.</p> <p>COMPETENCY (COM-1)</p> <p>CLO-4: able to work on and present simple mathematics problems with a numerical approach.</p> <p>Social (SOC-1)</p> <p>CLO-6: able to collaborate and be responsible professionally and ethically in completing tasks.</p>																														
Content:	<p>Studying basic concepts, approaches, error analyses, approximation of the roots of nonlinear equations by various methods, determination of a value by interpolation, calculation of numerical derivatives, and numerical integration.</p>																														
Study/exam achievements	<ul style="list-style-type: none"> Students are considered competent and pass if the final score calculated from the score of midterm exam, assignments, participation, and final exam is at least 55 or C. Final score is calculated as follows: 20% midterm exam + 30% assignments + 20% participation + 30% final exam Final index is defined as follows: <table border="1" data-bbox="628 1518 1278 1962"> <thead> <tr> <th>Index</th> <th>Converted Score</th> <th>Score Range</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>4.00</td> <td>$85 \leq A \leq 100$</td> </tr> <tr> <td>A-</td> <td>3.75</td> <td>$80 \leq A- < 85$</td> </tr> <tr> <td>B+</td> <td>3.50</td> <td>$75 \leq B+ < 80$</td> </tr> <tr> <td>B</td> <td>3.00</td> <td>$70 \leq B < 75$</td> </tr> <tr> <td>B-</td> <td>2.75</td> <td>$65 \leq B- < 70$</td> </tr> <tr> <td>C+</td> <td>2.50</td> <td>$60 \leq C+ < 65$</td> </tr> <tr> <td>C</td> <td>2.00</td> <td>$55 \leq C < 60$</td> </tr> <tr> <td>D</td> <td>1.00</td> <td>$40 \leq D < 55$</td> </tr> <tr> <td>E</td> <td>0.00</td> <td>$0 \leq E < 40$</td> </tr> </tbody> </table> 	Index	Converted Score	Score Range	A	4.00	$85 \leq A \leq 100$	A-	3.75	$80 \leq A- < 85$	B+	3.50	$75 \leq B+ < 80$	B	3.00	$70 \leq B < 75$	B-	2.75	$65 \leq B- < 70$	C+	2.50	$60 \leq C+ < 65$	C	2.00	$55 \leq C < 60$	D	1.00	$40 \leq D < 55$	E	0.00	$0 \leq E < 40$
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Media employed	<p>Slides and LCD projectors, white board</p>																														





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Reading list	<p>[1] Chapra Steven C, Canale Raymond P, 2002, <i>Numerical Methods for Engineers</i>, (Fourth Ed.). Mc Graw Hill.</p> <p>[2] Fuad, Y. (2010). <i>Metode Numerik I</i>. Unipress IKIP Surabaya.</p> <p>[3] Fink, K. K., & Mathews, H. J. (2004). <i>Numerical Methods using Matlab</i>, (4th Ed.). Pearson Education Inter.</p> <p>[4] Atkinson, K. (2003). <i>Elementary Numerical Analysis</i>, (3rd Ed.). John Wiley and Sons.</p> <p>[5] Fisher, M.E. (1985). <i>Introductory Numerical Methods for Scientists and Engineers</i>, (Revised Ed.). Department of Mathematics, The Univesity of Western Australia.</p> <p>[6] Gerald, C. F., & Weatley, P. O. (1984). <i>Applied Numerical Analysis</i>. Addison Wesley.</p> <p>[7] Patel, V. A. (1994). <i>Numerical Analysis</i>. Harcourt Brace College Publishers.</p>
Note	<p>*Total hours per 1 credit in 1 semester = $\{(1 \text{ credit} \times 240 \text{ minutes} \times 14 \text{ weeks})/60 \text{ minutes}\} = 56 \text{ hours}$.</p> <p>Each ECTS equals 25 hours, so 1 credit in 1 semester is equivalent to 2.24 ECTS.</p>
Last amendment	January 2023