



# 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	<b><i>Advanced Computational Mathematics</i></b>
Module level, if applicable	<b><i>Doctoral Program</i></b>
Code, if applicable	MMM 7603
Subtitle, if applicable	-
Courses, if applicable	<b><i>Advanced Computational Mathematics</i></b>
Semester(s) in which the module is taught	<b>II (first year)</b>
Person responsible for the module	<b><i>Chair of Computational Mathematics Research Group</i></b>
Lecturer(s)	<i>Dr. Sumardi, M.Si</i> <i>Prof. Imam Solikhudin, PhD</i>
Language	<i>Bahasa Indonesia</i>
Relation to curriculum	Elective
Teaching methods	<i>lecture and project.</i>
Workload (incl. contact hours, self-study hours)	<i>(Estimated) Total workload: The total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes self-study per week.</i>
Credit points	3
Required and recommended prerequisites for joining the module	<i>existing competences in Numerical Method</i>

Module objectives/intended learning outcomes	<p>After completing this course the students should have:</p> <ul style="list-style-type: none"> <li>• CO 1. combines one or more mathematical computational theories</li> <li>• CO 2. combines one or more numerical algorithms</li> <li>• CO 3. implements and executes algorithms in Matlab or other software.</li> </ul>
Content	<p>It is intended to provide doctoral students with training in algorithms and theory in scientific computation at doctoral level as a preparation for research in related areas. It covers the following major topics: Iterative methods for linear systems; Methods for nonlinear system of equations; Numerical methods for ordinary differential equations (ODEs); Fast numerical solvers for elliptic equations.</p>
Examination forms	oral présentation.
Study and examination requirements	Requirements for successfully passing the module
Media employed	White/Black Board, LCD Projector, Laptop/Computer
Reading list	<ol style="list-style-type: none"> <li>1. Gilbert Strang, 2012, <i>Computational Science and Engineering</i>, Wellesley- Cambridge Press</li> <li>2. Richard L. Burden and J. Douglas Faires., 2016, <a href="#">Numerical Analysis (10th Edition)</a>, Brooks/Cole Publishing Company.</li> <li>3. L. N. Trefethen and D. Bau III., 1997, <i>Numerical Linear Algebra</i>, Society for Industrial and Applied Mathematics (SIAM).</li> <li>4. Robert E White, 2016, <i>Computational Mathematics, Model, Method and Analysis with MATLAB and MPI</i>, Taylor &amp; Francis Group, LLC</li> <li>5. Xin-She Yang, 2008, <i>Introduction to Computational Mathematics</i>, World Sci. Publ.</li> </ol>

#### CO-PLO Mapping

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

Compilation Date :

Modified Date :