UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
Mathematics Department
Sekip Utara Bulaksumur Yogyakarta 55281 Telp: +62 274 552243 Fax: +62 274 555131 Email: math@ugm.ac.id Website: http://math.fmipa.ugm.ac.id

Undergraduate Programme in Mathematics
Telp : +62 274 552243
Email : maths1@ugm.ac.id; kaprodi-s1-matematika.mipa@ugm.ac.id sekprodi-s1-matematika.mipa@ugm.ac.id
Website : http://s1math.fmipa.ugm.ac.id/

MODULE HANDBOOK

Module name	Introduction to Optimization Theory
Module level, if applicable	Bachelor
Code, if applicable	MMM-3309
Subtitle, if applicable	-
Courses, if applicable	Introduction to Optimization Theory
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Lab. of Applied Mathematics
Lecturer(s)	Prof. Dr. Salmah, M.Si
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the third year (6th semester) Bachelor Degree
Type of teaching, contact hours	150 minutes lectures and 180 minutes structured activities per week.
Workload	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 individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	3
Requirements according to the examination regulations	Students have taken Introduction to Optimization Theory course (MMM-3309) and have an examination card where the course is stated on.
Recommended prerequisites	Students have taken Linear Programming course (MMM-2312) and have participated in the final examination of the course.
Module objectives/intended learning outcomes	After completing these course the students will be able: CO1. to understand basic concept in non linear optimization problems such as convex set, convex function and theorems related to optimization problems with convex functions. CO2. to solve optimization problems analitically such as optimization problem without constraints, optimization problem with equation constraints, and optimization problems with inequalitu constraints. CO3. to solve optimization problem numerically. CO4. to apply the theory to find and interpret the solutions of some optimization problem CO5. to use computer program to solve optimization problems numerically.
Content	Topics include Euclidean space, convex sets, convex functions, quadratic forms, real functions, gradient, directional derivative, local and global extrema, unconstrained extrema, constrained extrema with equation by Lagrange multiplier, constrained extrema with inequality by

	Kuhn-Tucker theory, numerical methods: direct search, gradient method, Newton-Raphson method, numerical method for n-dimensional problem, numerical method for constrained extrema problem
Study and examination requirements and forms of examination	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Final Examination — 45% 2 — Mid-Term Examination — 30% 3 — Class Activities: Quiz, Homework, etc. — 25% The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.
Media employed	Projector, board
Reading List	[1] Mokhtar S Bazaraa, Hanif D. Sherali, C.M.Shetty, 2006, *Nonlinear Programming. Theory andAlgorithms* 3rd Edition, John Wiley and Sons. [2] K.V. Mital, 1993, *Optimization Methods in Operations Research and Analysis*, Wiley Eastern Ltd. [3] Edwin K.P. Chong, dan Stanislaw H. Zak, 1996, *An Introduction to Optimization*, John Wiley & Sons. [4] P. Venkataraman, 2002, *Applied Optimization with MATLAB Programming*, John Wiley and Sons.

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1		v	v						
CO 2		v	v						
CO 3		v	v						
CO 4					v	v	v		v
CO 5				v		v			