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MODULE HANDBOOK

Module designation	*Partial Differential Equations and Boundary Value Problems*
Semester(s) in which the module is taught	*4*
Person responsible for the module	*Rahmi Rusin*
Language	*Indonesian*
Relation to curriculum	*Compulsory*
Teaching methods	*Lectures, group discussions*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 8.5 hours x 14 weeks + 3 hours x 2 weeks* *Contact hours: 2.5 hours lectures per week* *Private study including examination preparation, specified in hours[1]:* *3 hours structured activities, and 3 hours individual study per week*
Credit points	*3 SKS (4.77 ECTS)*
Required and recommended prerequisites for joining the module	*Ordinary Differential Equations*
Module objectives/intended learning outcomes	*After completing the course, students have the ability to identify boundary value problems of order 1 and 2 and solve them analytically by basic techniques of partial differential equations.*

[1] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Content	1. *PDE Models, classification of PDE's and type of boundary conditions, characteristics coordinates and canonical form.* 2. *Conservation Laws, The method of characteristics, singular solution of wave equations of order 1 (shockwave).* 3. *Diffusion, Vibrations and Acoustics, Steady-State solutions of order 1 dan 2 PDE's , Laplace's Equations.* 4. *Cauchy problem for the heat equation, Cauchy problem for the wave equation, semi-infinite domains.* 5. *Well-Posed problems, Sources and Duhamel's principle* 6. *Laplace transforms & Fourier transforms.* 7. *Fourier method and orthogonal expansions.* 8. *Overview of separation of variables.* 9. *Sturm-Liouville problems, generalization and singular problems.* 10. *Laplace's equation with bounded domain, cooling of a sphere.* 11. *Diffusion in a disk, sources on bounded domains.*
Examination forms	1. *Class activities : Quiz, homework* 2. *Group discussion sessions* 3. *Mid-term examination* 4. *Final examination*
Study and examination requirements	*The final mark will be weighted as follows:* 1. *Homework (20%).* 2. *Written Quiz (20%).* 3. *Mid-term examination (30%).* 4. *Final examinations (30%).* *To succesfully pass the module it requires minimum 55% of the total mark.* *Mark — Grade* *85—100 — A* *80—<85 — A-* *75—<80 — B+* *70—<75 — B* *65—<70 — B-* *60—<65 — C+* *55—<60 — C* *40—<55 — D* <40 — E

Reading list	1. *J. David Logan, Applied Partial Differential Equations: 3rd Edition (Undergraduate text in mathematics), Springer, 2015.* 2. *Lecturer's Handout.* 3. *Videos.*