UNIVERSITAS INDONESIA
Faculty of Mathematics and Natural Sciences
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MODULE HANDBOOK

Module designation	*Research Operation*
Semester(s) in which the module is taught	*5*
Person responsible for the module	*Dr. Zuherman Rustam, D.E.A.*
Language	*Indonesian*
Relation to curriculum	*Elective*
Teaching methods	*Lecture, discussion, project.*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 9 hours/week x 14 weeks + 5.5 hours/week x 2 weeks = 137 hours.* *Contact hours: 150 minutes lectures.* *Individual study including examination preparation, specified in hours :* *3 hours structured learning and 3 hours individual study per week.*
Credit points	*3 SKS (4.77 ECTS)*
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	*After completing the course, students have the ability* 1. *To explain the characteristic and principle of dynamic programming optimization problems.* 2. *To solve deterministic and probabilistic dynamic programming problems.* 3. *To solve problems related to dynamic programming.* 4. *To explain the characteristics of the queuing system.* 5. *To explain various models of queuing systems.* 6. *To explain Markov system.* 7. *To use Markov system to analyze stochastic processes.* 8. *To solve problems related to the queuing system.*

Content	*1. Characteristics and principles of deterministic and probabilistic dynamic programming optimization problems.* *2. Dynamic programming applications in the real world.* *3. Characteristics and various models of queuing systems.* *4. Markov system.* *5. Application of queuing theory in the real world.* *6. The use of software to solve dynamic programming and queuing system problems.*
Examination forms	*Oral presentation, essay.*
Study and examination requirements	*The final mark will be weighted as follows:* *1. Quiz (15%)* *2. Homework (20%).* *3. Mid-term examination (25%)* *4. Final report (20%)* *5. Presentation (20%)* *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	F. S. Hillier and G. J. Lieberman, *Introduction to Operations Research*, 10th ed. McGraw-Hill Education, 2015.