## Linear Programming

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| Module designation | Linear Programming |
| Semester(s) in which the module is taught | 2 |
| Person responsible for the module | Dr. Eti Dwi Wiraningsih/Ibnu Hadi, M. Si  |
| Language | Indonesia |
| Relation to curriculum | *Compulsory*  |
| Teaching methods | Teaching methods used in this course are:* Lecture (small group discussions and project-based learning)
* Structured assignments (individual task)
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| Workload (incl. contact hours, self-study hours) | Total workload is 510 minutes  per week which consists of 150 minutes learning activity, 180 minutes structured task and 180 minutes individual learning per week for 16 weeks. **TOTAL WORKLOAD PER SEMESTER** **510 X 16 = 8160 minutes = 136 hours**  |
| Credit points | 136 hours / 30 hours $≈$ 4,5 ECTS |
| Required and recommended prerequisites for joining the module | *Linear Algebra* |
| Program intended learning outcomes | **PLO 5**. Able to make appropriate decisions in the context of solving problems in their area of expertise, based on the results of information and data analysis.**PLO 8**. Mastering the principles of mathematical modeling, linear programming, differential equations, and numerical methods.**PLO 9**. Able to conduct research independently or in groups that can be used to provide guidance to stakeholders in choosing various alternative solutions to problems in mathematics.**PLO 11**. Able to observe, recognize, formulate and solve problems through a mathematical approach with or without the help of software.Course Learning Outcomes (CLO) to be achieved in this course are:

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| CLO 1 | : | Be able to formulate the concept of algebraic manipulation for solving linear programming problems |
| CLO 2 | : | Be able to solve linear programming problems using graphical methods |
| CLO 3 | : | Be able to formulate theories and concepts of the simplex method for solving mathematical problems |
| CLO 4 | : | Be able to relate the relationship between the primal and dual cases |
| CLO 5 | : | Be able to formulate a mathematical model formulation for integer problems |
| CLO 6 | : | Able to analyze transportation problems |
| CLO 7 | : | Able to analyze assignment issues |
| CLO 8 | : | Able to implement theoretical concepts with the help of software |
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The relationship between PLO and CLO in this course is described as follows:

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| CLO | PLO |
| 5 | 8 | 9 | 11 |
| 1 | √ |  |  |  |
| 2 |  | √ |  | √ |
| 3 |  |  |  |  |
| 4 | √ |  |  | √ |
| 5 | √ |  | √ |  |
| 6 |  | √ |  |  |
| 7 |  |  | √ |  |
| 8 | √ |  | √ |  |

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| Content | **Students will learn about:**Mathematical Models, Linear Programming, Graphical Method, The Simplex Method, Primal Dual, Integer Programs, Transportation, Assignments |
| Examination forms | Assessment for this course includes:20% structured assignments, 30% midterms and 50% final exams |
| Study and examination requirements  | **Study and examination requirements:**Students should have attended all lectures and submitted all scheduled individual and group assignments prior to the final examination. |
| Reading list | **Main References:** Bazaraa Mokhtar & Jarvis John J. (1977). *Linear Programming and Network Flows*. New York – London – Santa Barbara – Sydney – Toronto: John Willey & Sons.**Additional References:**1. Sitorus, Parlin, 1997, *Program Linear*, Universitas Trisakti, Jakarta.
2. Soemartojo, N., 1988, *Program Linear*, Universitas Terbuka.
3. Supranto, J., 1983, *Linear Programming*, Edisi Kedua, Fakultas Ekonomi Universitas Indonesia.
4. Taha, H.A., 2003, *Operation Research*: *An Introduction*, Seventh Edition, Prentice Hall.
5. Taylor, Bernard W., 2005, *Introduction to Management Science*, Eighth Edition, Prentice-Hall.
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