## MODULE HANDBOOK DESCRIPTION

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| Module designation | Power System Analysis I |
| Code | FBA3101 |
| Semester(s) in which the module is taught | 5/third year |
| Person responsible for the module | I Made Ari Nrartha, S.T., M.T., Dr. I Made Ginarsa, S.T., M.T., Agung Budi Muljono, S.T., M.T. |
| Language | Indonesian |
| Relation to curriculum | Compulsory for electrical power systems students |
| Teaching methods | Lecture, small group discussion, case base method. |
| Workload (incl. contact hours, self-study hours) | Contact minutes every week, each week of the 16 weeks/semester : <ul><li>Lectures: 2 x 50 minutes</li><li>Exercises and Assignments: 2 x 60 minutes</li><li>Private study: 2 x 60 minutes.</li></ul> Total study hours = 5 hours 40 minutes/week |
| Credit points | *2 (~ 3,2 ECTS)* |
| Required and recommended prerequisites for joining the module | - Basic Programming (FBS1215) <br> - Electrical Circuit I (FBS1213) <br> - Electrical Circuit II (FBS2122) <br> - Numerical Method (FBS2230) |
| Module objectives/intended learning outcomes | 1. Students are able to explain the basic concepts of electric power systems. <br> 2. Students are able to calculate units per unit of electrical power system equipment. <br><br> PLO3 |
| | 3. Students are able to analyse admittance models and network calculations. <br> 4. Students are able to analyse the components of symmetry for electric power distribution networks. <br><br> PLO3 and PLO4 |
| | 5. Students are able to analyse the power flow of transmission systems and distribution systems. <br><br> PLO3, PLO4 and PLO5 |

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| Content | One and two subscript notations, single-phase system power, three-phase system power, change in quantity per unit, unit per unit transformer, unit per unit transmission/distribution line, internal impedance diagram per unit, branch and node admittances, branch coupling magnetic field on Ybus, equivalent admittance network, modification of Ybus, incident matrix of Ybus network, Ybus calculation for short transmission lines and pi models, Gaussian elimination method, synthesis of asymmetric phasors from symmetrical components, symmetrical components of asymmetrical phasors, symmetrical components of star circuits and delta, power in terms of symmetrical components, networks of symmetrical transmission lines, transmission system power flows, and distribution system power flows. |
| Examination forms | - Multiple choice examination and Essay, <br> - Présentation case study. |
| Study and examination requirements | The final grade in the module is composed of: <br><br> a. Per-meeting score = 5 % x 16 meeting = 80% <br> b. Exercise Report/ Homework/Portofolio = 20% <br> Students must have a final grade of 65% or higher to pass |
| Reading list | 1. Nrartha, I. M., A., 2020, "Buku Ajar Analisa Sistem Tenaga I", buku ajar, Jurusan Teknik Elektro, Fakultas Teknik, Universitas Mataram. <br> 2. Nrartha, I. M., A., Sultan, Muljono, A., B., 2012, "Rancang Bangun Perangkat Lunak Untuk Evaluasi Studi Aliran Daya Tiga Fase Dengan Metoda Kompensasi", laporan penelitian dana DIPA BLU, Universitas Mataram. <br> 3. Grainger, J.J., dan Stevenson W.D.Jr., 1994, "Power Sistem Analysis", McGraw-Hill, Inc., Singapore. <br> 4. Saadat, H., 1999, "Power System Analysis", McGraw-Hill, Singapore. <br> 5. Power system analysis from paper journal. |