Example form for Module Handbook

The **Module**[1] **Handbook** or **complete collection of module descriptions** serve as a **key tool** for the assessment of your study programmes**.** In addition, **their primary purpose** should be to serve as a **reliable source of information for students.** They should therefore be made available to students in the **course language** and **translated into English** for the assessors**.** A module description should contain the following information about the module:

Module designation	
Semester(s) in which the module is taught	
Person responsible for the module	*Please indicate a specific person.*
Language	
Relation to curriculum	*Compulsory / elective / specialisation* *Names of other study programmes with which the module is shared*
Teaching methods	*e.g. lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload:* *Contact hours (please specify whether lecture, exercise, laboratory session, etc.):* *Private study including examination preparation, specified in hours*[2]*:*
Credit points	
Required and recommended prerequisites for joining the module	*E.g. Algebra 101…* *E.g. existing competences in ...*

[1] "Modules" are units of instruction, composed of a sum of teaching and learning whose contents are concerted. In some countries, modules may be known as "courses".

[2] 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.

Module objectives/intended learning outcomes	*Key question: what learning outcomes should students attain in the module?* *E.g. in terms of:* - *Knowledge: familiarity with information, theory and/or subject knowledge* *Skills: cognitive and practical abilities for which knowledge is used* - *Competences: integration of knowledge, skills and social and methodological capacities in working or learning situations*[3] *E.g.: "Students know that/know how to/are able to…"*
Content	*The description of the contents should clearly indicate the weighting of the content and the level.*
Examination forms	*e.g. oral presentation, essay, etc.*
Study and examination requirements	*Requirements for successfully passing the module*
Reading list	*Names of textbooks, articles, etc.*

[3] Cf. European Commission: Proposal for a Recommendation of the European Parliament and the European Council on the establishment of the European Qualifications Framework for lifelong learning, COM(2006) 479 final, 2006/0163 (COD), Brussels 05/09(2006.

MODULE HANDBOOK

Module designation	*Analog Electronics*
Semester(s) in which the module is taught	*4th semester*
Person responsible for the module	*Faculty of engineering, Department of electrical engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Case study*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	*Electrical Circuit 1*

Module objectives/intended learning outcomes	1. *Students are able to explain concepts about semiconductor materials using their own sentences.* 2. *Students are able to interpret information about the characteristics of electronic components which include diodes, transistors, MOSFETs.* 3. *Students are able to use the basic concepts of op-amps and op-amp characteristics in inverting and non-inverting amplifier applications.* 4. *Differential amplifiers, integral amplifiers, instrumentation amplifiers and positive feedback amplifiers.* 5. *Students are able to use the concept of filters in applications which include LPF, HPF, BSF and BPF.* 6. *Students are able to explain the concept of the Oscillator using their own sentences.* 7. *Students are able to explore the development of other semiconductor components in electronics.*
Content	*Discussion of semiconductor materials; characteristics of electronic components which include diodes, transistors, MOSFETs; op-amp characteristics in inverting and non-inverting amplifier applications, differential amplifiers, integral amplifiers, instrumentation amplifiers and positive feedback amplifiers; filters in applications which include LPF, HPF, BSF and BPF; Oscillator; and other semiconductor components in electronics with case study teaching method.*
Examination forms	*Essay*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*
Reading list	1. *Floyd, Thomas L. 2005. Electronic Devices. New Yersey: Prentice Hall* 2. *Paynter, Robert dan Boydell, Toby. 2006. Introductory Electronics Devices and Circuits. Singapore: Pearson Education Asia* 3. *Floyd, Tom dan Buchla, Dave. 2002. Fundamentals of Analog Circuits. New Yersey: Prentice Hall* 4. *Grob, Bernard dan Mitchel, Schultz. 2003. Basic Electronics. Singapore: McGraw-Hill Education* 5. *Schuler, Charles A. 2003. Electronics Principles and Applications New York: McGraw-Hill* 6. *Anderson, Betty Lise dan Anderson, Richard L. 2005. Fundamentals of Semiconductor Devices. Singapore: McGraw-Hill*

Module designation	*Power Electronics*
Semester(s) in which the module is taught	*4th semester*
Person responsible for the module	*Faculty of engineering, Department of electrical engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Case study*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	*Electrical Circuit 1* *Electromagnetic Field*

Module objectives/intended learning outcomes	1. *Students are able to explain concepts about power semiconductor components, power diodes, thyristors.* 2. *Students are able to explain concepts about the basic theory of rectifiers, Diode rectifiers - Single Phase Bridges, Voltage Multiplier (Single Phase) rectifiers, Three Phase Full Bridge rectifiers and comparisons of Single Phase and Three Phase Rectifiers.* 3. *Students are able to analyze controllers on rectifiers and controlled frequency reversers, analysis of Three-Phase Converters, AC Conductivity effects, Current effects, Discontinuity, Inverting Operations, AC Waveforms, and other Three-Phase converters.* 4. *Students are able to use concepts about commutation techniques.* 5. *Students are able to explore the chopper circuit tentac, switching converter model, various chopper strands and chopper strand configurations.* 6. *Students can explain the basic AC voltage regulator and DC voltage regulator circuit.* 7. *Students are able to conduct analysis on inverter circuits and the basic concepts of Reverse Model Switches, Single Phase Reversers, Three Phase Reversers, Other Inverting Schemes Switches and rectifier operating models.* 8. *Students are able to explore the application of power supply and motor drive.*
Content	*This course discusses the characteristics of Power Electronics components which include Diodes, Thyriston, DIAC, TRIAC, UJT, FET, Electronic switch analysis, Rectifier pulse generator circuit analysis using diodes for one phase and three phase, Rectifier using SCR for one taste and three flavors Inverter one taste and Inverter three flavors. As well as the use of electronic circuits for the arrangement of electrical machines with case study teaching method.*
Examination forms	*Essay*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*

Reading list	1. *Singh, MD. 1998. Power Electronics, New Delhi, Tata McGraw Hill- Publishing Company Limited.* 2. *Rashid, Muhammad H. 2004. Power Electronics: Circuits, Devices, and Applications, 3 NO. ED. Prentice Hall Inc. New Jersey.* 3. *Sen, P. C. 1990. Power Electronics. Tata McGraw Hill-Publishing Company Limited. New Delhi.* 4. *R. W. Erickson. 1997. Fundamentals of Power Electronics* 5. *R.S. Ramshaw. 1993. Power Electronics Semiconductor Switches*

Module designation	*Semiconductor and Microelectronic Devices*
Semester(s) in which the module is taught	*5th semester*
Person responsible for the module	*Faculty of engineering, Department of electrical engineering*
Language	*Indonesian*
Relation to curriculum	*Elective courses*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	1. *Students can explain about MOS transistors consisting of n-channel MOS and p-channel MOS types.* 2. *Students are able to apply the design stage of a digital integrated circuit from schematic to design ready to be sent to the foundry.* 3. *Students are able to explore the CMOS inverter as the most important circuit in digital circuit design.* 4. *Students are able to explore the CMOS inverter as the most important circuit in digital circuit design* 5. *Students are able to analyze the labrication process.* 6. *Students are able to analyze the realization of a combination circuit with static complementary CMOS and transmission gate.*

	7. *Students are able to analyze the architectural design techniques of the radix-4 multiplier booth.* 8. *Students are able to explore the design of analog components.* 9. *Students are able to plan, design and evaluate sequential circuit simulations.*
Content	*This course discusses semiconductor device theory and the basic concepts of integrated circuit design and how to analyze them using the project-based learning method.*
Examination forms	*Oral presentation*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*
Reading list	1. *S.M. Sze.1985. Semiconductor Devices Physics and Technology. John Wiley & Sons.* 2. *R.L. Geiger, P.E. Allen, N.R. Strader. 1990. VLSI Design Technique for Analog and Digital Circuit. McGraw-Hill* 3. *Neil H. waste, Kamran Eshragian. 1989. Principles of VLSI Design- A System Perspective. New York: Addisson.* 4. *Douglas A. Pucknell, Kamran Eshragian. 1989. Basic VLSI Design, System and Circuits . New Delhi: Prentice Hall.*

Module designation	*Basic Algorithm and Programming 1*
Semester(s) in which the module is taught	*1st semester*
Person responsible for the module	*Faculty of engineering, Department of electrical engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Case study*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Students are able to explain concepts about logic and algorithm.* 2. *Students are able use data type in declaring variables.* 3. *Students are able to use program structure such as sequence, selection, and looping* 4. *Students are able to use array variable to store value of variables* 5. *Students are able to implement programming to solve simple problem*
Content	*The Basic Algorithms and Programming course is a course with a case study-based learning model which discusses the introduction and understanding of logic, algorithms, basic programming languages, program structure, data types, algorithm notation, control, repetition, functions, sequential processing, as well as practice problems. It's simple to be able to analyze a problem related to logic or ways of thinking which is then implemented into a programming language.*
Examination forms	*Essay*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*

Reading list	*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United State of America: Pearson Education, Inc.* *2. Kulikov, Alexander S., and Pevzner, P. 2018. Learning Algorithms Through Programming and Puzzle Solving. United States of America: Active Learning Technologies.*

Module designation	*Data Communication*
Semester(s) in which the module is taught	*4th semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Case study*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self-assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to explain both orally and in writing the concept of Data Communication, transmission media, analyzing interfacing techniques, multiplexing, implementing data link control processes, applying switching techniques to everyday problems, presenting the OSI Model, as well as TCP/IP protocols starting from sending data at the layer physical form of analog and digital data, analog and digital modulation, and their implementation.* 2. *Able to convey ideas and innovation results both verbally and regarding transmission media, analyze interfacing techniques, multiplexing, apply data link control processes, apply switching techniques to everyday problems, present the OSI Model, as well as TCP/IP protocols starting from sending data at the layer physical form of analog and digital data, analog and digital modulation, and their implementation.* 3. *Able to be responsible for professional ethics and be responsible for solving problems based on the concept of data communication.*
Content	*The concept of Data Communication, transmission media, analyzing interfacing techniques, multiplexing, implementing data link control processes, applying switching techniques to everyday problems, presenting the OSI Model, as well as TCP/IP protocols starting from sending data at the layer physical form of analog and digital data, analog and digital modulation, and their implementation.*
Examination forms	*Essay*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*

Reading list	*1. W. Stallings. 2007. Data Communication and Computer. 2nd edition. McGraw Hill.* *2. B. Forouzan. 2001. Data Communication and Networking. 2nd edition. McGraw Hill.*

Module designation	*IoT System*
Semester(s) in which the module is taught	*5th semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to apply IoT to solve problems in the engineering field.* 2. *Able to apply engineering principles, identify, formulate and analyze data/information to solve problems using IoT systems.*
Content	*Internet of Things is structured as an effort to implement learning for the Internet of Things course which aims to provide students with understanding and experience in designing IoT-based application systems. The discussion in this lecture is about building a simple IoT infrastructure starting from node devices that function as sensors and accuators, gateways as communication bridges to the internet and IoT as a platform as a provider of data storage and management services. The learning model developed is Student Centered Learning (SCL) so that students are expected to have read carefully the assignment plan and the references referred to before carrying out the learning process.*
Examination forms	*Project, report, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*

Reading list	*1. Robbins, Michael F. 2019. Ultimate Electronics: Practical Circuit Design and Analysis. CircuitLab Inc.* *2. Qusay F. Hassan, Atta ur Rehman Khan, Sajjad A. Madani. 2018. Internet of Things: Challenges, Advances, and Applications. CRC Press.* *3. Maneesh Rao. 2018. Internet of Things with Raspberry Pi 3: Leverage the power of Raspberry Pi 3 and JavaScript to build exciting IoT project. Packt Publishing.* 4. National and international research journal in the scope of IoT.

Module designation	*Biomedical Instrumentation and Signal Processing*
Semester(s) in which the module is taught	*5th semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 23.33* *Structured assignment: 28.00* *Self assignment: 28.00* *Total workload: 79.33*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to apply knowledge of mathematics, natural sciences, and Biomedical Instrumentation and Signal Processing to gain a thorough understanding of engineering principles.* 2. *Able to be responsible by complying with norms, professional ethics and responsible for solving electrical engineering problems based on instrumentation and biomedical signal processing.* 3. *Able to design systems or components of instrumentation and biomedical signal processing to be applied in the field of electrical engineering.*
Content	*The biomedical instrumentation and signal processing course is an advanced course for students who are interested in studying the field of biomedical electronics engineering. In this course, two basic materials will be discussed, namely biomedical instrumentation and biomedical signal processing. Biomedical signals themselves are unique signals because they have very small amplitudes but very large noise. So the instrumentation and signal processing used is different from other electronic equipment. Students who wish to take this course are expected to have mastered the concepts of analog electronic circuits and digital signal processing. After taking this course, students are expected to be able to design and manufacture biomedical instrumentation. Furthermore, students are expected to be able to understand and apply several forms of biomedical signal processing.*
Examination forms	*Project, report, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*

Reading list	*1. Hadiyoso, Sugondo & Rizal, Achmad. 2014. Instrumentasi Biomedis berbasis PC. Gava Media.* *2. Khandpur, R. S. 1992. Handbook of Biomedical Instrumentation, Second Edition. Tata Mcgraw-hill.* 3. National and international research journal in the scope of *Biomedical Instrumentation and Signal Processing.*

Module designation	*Numerical Methods*
Semester(s) in which the module is taught	*1st semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 34.00* *Structured assignment: 42.00* *Self assignment: 42.00* *Total workload: 118.00*
Credit points	*3 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to work in a team in solving problems using numerical methods.* 2. *Able to apply numerical methods to solve problems in the field of engineering, namely Absolute Error, Relative Error, numerical methods for solving the roots of equations (Bisection, Regulafalsi, Newton Method, Secant Method, and Direct Method), solving systems of linear equations, regression, interpolation , and numerical integration.*
Content	*Absolute Error, Relative Error, numerical methods for solving the roots of equations (Bisection, Regulafalsi, Newton Method, Secant Method, and Direct Method), solving systems of linear equations, regression, interpolation , and numerical integration.*
Examination forms	*Case study, paper based test, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*

Reading list	*1. Chapra, S.C., Canale, R.P. 2006. Numerical Methods for Engineers 5th ed. McGraw-Hill.* *2. Soeharjo.1985. Analisa Numerik.* *3. Munif, A., Prastyoko, A.1995. Penguasaan dan Penggunaan Metode Numerik. Guna Widya.* 4. Lilik Anifah, Metode Numerik, 2023, Penerbit KBM Indonesia.

Module designation	*Intelligent Computing*
Semester(s) in which the module is taught	*1st semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 34.00* *Structured assignment: 42.00* *Self assignment: 42.00* *Total workload: 118.00*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to work in a team in solving problems using numerical methods.* 2. *Able to apply The artificial intelligence course in this course will provide the basics of artificial intelligence which focuses on several applications of artificial intelligence and several problem solving techniques in artificial intelligence known as soft computing. Apart from that, study several theories and applications of intelligent systems. Artificial Intelligence is a reasoning system that can be created on a computer to solve various daily problems according to knowledge from data and experts.*
Content	*Propositional Logic, Inference Engine,Fuzzy logic, fuzzy set, defuzzifikasi, Intelligence system, Neural Network, Neural network model for analysis problem,Supervised learning, Unsupervised learning, parameter analysis and evaluation AI application*
Examination forms	*Case study, paper based test, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*
Reading list	1. *Suyanto, 2014, Artificial Intelligence revisi kedua – informatika Bandung,* *2. Russel, 2011, Stuart, Artificial Intelligence : a modern Approach, pearson,*

Module designation	*Linear Algebra and Discrete Structures*
Semester(s) in which the module is taught	*1st semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 34.00* *Structured assignment: 42.00* *Self assignment: 42.00* *Total workload: 118.00*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to work in a team in solving problems using numerical methods.* 2. *Able to apply The Linear Algebra and Discrete Structures course is a basic mathematics course that discusses Systems of Linear Equations, Matrices, Determinants, Vectors, Eiegen Values & Eigen Vectors, as well as the basic concepts of Discrete Mathematics*
Content	*Linear Equation System & Gauss Elimination Linear Equation System & Gauss Elimination, Matrix Operations Matrix Operations, Determinants Determinants, Vector Space (Euclidean & General) Vector Space (Euclidean & General), Eigen Value and Eigen Vector, Diagonalization of Eigen Value and Eigen Vector , Diagonalization, Sets, Set Operations, and Functions Sets, Set Operations, and Functions, Relationships, Graphs*
Examination forms	*Case study, paper based test, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*
Reading list	1. *Howard Anton and Chriss Rorres, 2014, 11th Edition of Elementary Linear Algebra, 2014* 2. *Kenneth H. Rosen, 7th Edition of Discrete Mathematics and Its Applications*

Module designation	*Electrical Power System Analysis*
Semester(s) in which the module is taught	*1st semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 34.00* *Structured assignment: 42.00* *Self assignment: 42.00* *Total workload: 118.00*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to work in a team in solving problems using numerical methods.* 2. *Able to apply The Power System Analysis course discusses and explains the basics of calculation analysis, calculating electric power flow, regarding symmetric components and analyzing unsymmetrical disturbances and the stability of electric power systems. This lesson also discusses and analyzes short circuit disturbances in an electric power system, symmetrical three-phase faults, symmetrical components, unsymmetrical faults and power system stability. Lectures are carried out proportionally between theory and practice (assignments), discussions of theory are carried out in general, philosophical motivations for electric power systems, differences between existing theories, methods, modeling and applications and analysis.*

Content	*1. Power flow calculations use the Gaussian and Newton Raphson methods and Definition of short circuit fault analysis* *2. Types of disturbances that occur in 3 phase electric power systems:* *a. Symmetrical three-phase shunt (short circuit) fault* *b. Series fault (open circuit)* *c. Simultaneous interference* *3. Short circuit in 3 phase generators in load and unload conditions* *4. Simulation of short circuit analysis in electric power system circuits (In this chapter, calculate the short circuit current of each bus, current in the line and current from the generator)* *5. Symmetrical three-phase fault* *6. Symmetrical components (3 phase unbalanced voltage phasors, power in unbalanced three phase systems, sequence impedance of synchronous machines and transformers)* *7. Asymmetrical disturbances* *8. Short circuit between phases through impedance* *9. Three phase short circuit to ground* *10. Power system stability (Main Factors and stability issues)* *a. There is a balance between the input power and the output power of the electrical load on the system* *b. Electric power system stability: The ability of an electric power system or part of a system component to maintain synchronization and balance within the electric power system* *c. Transient stability and dynamic stability* *d. Steady state stability (electric power generated by a balanced generator) and transient stability*

Examination forms	*Case study, paper based test, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*
Reading list	1. *Stevenson, William D. 1984. Analisis Sistem Tenaga Listrik. Jakarta. Penerbit Erlangga* 2. *Lazaar, Irwan. 1980. Electrical System Analysis and Design for Industrial Plants. New York. McGraw-Hill Book Company.* 3. *Grainger, John J. and Stevenson, William D. 1994. Power System Analysis. Singapore. McGraw-Hill*

Module designation	*Electric Power System Operation*
Semester(s) in which the module is taught	*1st semester*
Person responsible for the module	*Faculty of Engineering, Department of Electrical Engineering*
Language	*Indonesian*
Relation to curriculum	*Compulsory Course*
Teaching methods	*Project Based Learning*
Workload (incl. contact hours, self-study hours)	*Lecturer: 34.00* *Structured assignment: 42.00* *Self assignment: 42.00* *Total workload: 118.00*
Credit points	*2 CU*
Required and recommended prerequisites for joining the module	-

Module objectives/intended learning outcomes	1. *Able to work in a team in solving problems using numerical methods.* 2. *Able to apply knowledge about the process of delivering electric power to customers, the ability to schedule the load of interconnected generating systems, have knowledge about the characteristics and reliability of electric power plants, have the ability to load generating units, students have knowledge about obstacles and disturbances in the operation of electric power systems, have the ability to analyze knowledge frequency.*
Content	*Interconnected electric power systems, characteristics of power plants, scheduling system maintenance and operations, system reliability calculating LOLP (Loss of Load Probability), load distribution of generating units, hydrothermal optimization, generator constraints, system security, operation control.*
Examination forms	*Case study, paper based test, and presentation.*
Study and examination requirements	*20% Mid-semester exam + 30% Semester exam + 30% assignment + 20% attendance and participation*
Reading list	1. *Bruce F.,Wollenberg, 2001, Power System Operation and Control, The Electric Power Engineering Handbook, Ed. L.L. Grigsby, CRC Press LLC.* 2. *Djiteng Marsudi, 2006, Operasi Sistem Tenaga Listrik, Cetakan Pertama, Graha Ilmu, Yogyakarta* 3. *Leonard L. Grigsby, 2006, Power Systems, Electric Power Engineering Handbook Second Edition. New York: Taylor and Francis Group.*