ABET

Self-Study Report

for the

Electrical Power Engineering Program

at

Institut Teknologi Bandung

West Java – Indonesia

June, 20th, 2017

CONFIDENTIAL

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Program Self-Study Report

for
EAC of ABET
Accreditation

BACKGROUND INFORMATION

A. Contact Information

Dr. Ir. Nanang Hariyanto
School of Electrical Engineering and Informatics
Institut Teknologi Bandung
Labtek VIII 2nd Floor
Jl. Ganesha No. 10, Bandung 40132, Indonesia
Phone: +62222502260, Fax: +6222234222
Email: nanang.hariyanto@stei.itb.ac.id

B. Program History

History of Electrical Power Engineering education in Indonesia can be traced back since 1942 by Electrical Laboratory of the Technische Hoogeschool te Bandoeng during Netherland occupation period. Following Japan occupation time, in 1944 Kogyo Daigaku was established replacing the Technische Hoogeschool te Bandoeng. In this Kogyo Daigaku, education of Kikaika Denki (Electric & Machinery section) was introduced. Formally, the Electrical Power Engineering education program began in 1947 by establishment of Electrical Engineering Department.

In 2006, Electrical Engineering department and Informatics department of Institut Teknologi Bandung were joined into a new school/faculty named School of Electrical Engineering and Informatics (SEEI). The Electrical Power Engineering Study Program is then established in 2009. Since then, the program was led by Dr. Ir. Muhammad Nurdin, and recently by Dr. Ir. Nanang Hariyanto. Until now, Electrical Power Engineering Program has managed to graduate 248 Bachelors. They worked all over the country and even many of them overseas. They contribute a lot to our National Development.

The EPE Program regularly obtains the highest accreditation “A” level from by BAN PT (National Accreditation Body for Higher Education). The latest accreditation was obtained in February 2015 by BAN PT’s decree 030/SK/BAN-PT/Ak-XV/S/I/2013 for another 5 years up to 31 January 2018. Currently re-accreditation process for BAN PT accreditation is on going.

C. Options

The Electrical Power Engineering program currently does not have options nor concentration within its program.

D. Program Delivery Modes

The Electrical Power Engineering program is currently delivered through full time days mode only by traditional conventional lecture/laboratory.

E. Program Locations

The Electrical Power Engineering program is regularly offered only in Ganesha Campus, Jl. Ganesa No. 10, Bandung, Indonesia. The program currently does not offer dual degrees nor partnerships elsewhere.

F. Public Disclosure

The information on Program Education Objectives (PEOs), Student Outcomes (SOs) data of the Electrical Power Engineering program are made accessible to the public in the web, i.e.

https://epe.stei.itb.ac.id/program-educational-objectives/

https://epe.stei.itb.ac.id/student-outcomes/

G. Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions taken to Address them

None – This is the first evaluation of the Program.

GENERAL CRITERIA

CRITERION 1. STUDENTS

A. Student Admissions

The admission of the undergraduate program students in the university is based on the results of Admission Tests specially administered for that purposes. The EPE program does not have additional admission requirements beyond the requirements of the university. Since 2015/2016 academic year, all types of the student admission to the university is managed by newly established directorate, i.e. Executive Directorate for Admission ITB.

Each year, the number of students accepted is determined by the quota set by ITB based on the number proposed by the schools. Two admission schemes are conducted by Institut Teknologi Bandung.

1) National Entrance Selection (*Seleksi Nasional Masuk Perguruan Tinggi Negeri* or SNMPTN) since 2011. Students who is accepted through this scheme should fullfil some criteria, as follows,
   - The selections are on-line and based on the first two years academic performance of the candidates in their senior high school.
   - A number of the best candidates that fulfill the quota will be admitted,
   - A psychological-test after admission is taken by the new students
2) National Entrance Examination (*Seleksi Bersama Masuk Perguruan Tinggi Negeri* or SBMPTN), this is nation-wide university entrance examination that was held since 1977, in which student should comply these criteria,
   - Passing grade is set by the quota of students to be admitted.
   - A number of the best candidates that fulfill the quota will be admitted,
   - A psychological-test after admission is taken by the new students

In the latest SBMPTN 2016, the passing grade for admission into the university (ITB) was the highest in Indonesia. Within ITB, the passing grade of SEEI was the second highest compared to the other Faculties/Schools. Table 1.1 shows the summary of the recruitment results of the two recruitment activities above in the past six years.

Table 1.1 History of Admissions Standards for Freshmen Year into SEEI

SEEI	SNMPTN			SBMPTN	Total Annual Enrollment
Academic Year	Applicants	Admitted	Selectivity	Passing Grade	
2016/2017	2342	251	1 : 9.33	698.6	443
2015/2016	3665	254	1 : 14.4	689.7	430
2014/2015	3358	243	1 : 13.8	701.0	410
2013/2014	7111	245	1 : 29.0	725.3	409
2012/2013	2821	239	1 : 11.8	749.0	419

2011/2012	3074	271	1 : 11.3	725.3	448

The admission is for all new students entrance to the School of Electrical Engineering and Informatics (SEEI). All new students are therefore enrolled as the students of SEEI for their freshman year. All new students enroll the ITB Common Preparatory Level within the School of Electrical Engineering and Informatics and this ITB Common Preparatory Level must be completed successfully in 1 year or maximum 2 years. Students are then admitted to EPE program, as well as other program, starting in the second year as sophomore by selection process conducted by SEEI.

The admission process to the program begin at the end of the ITB Common Preparatory Level year, the students of School of Electrical Engineering and Informatics will have to be distributed into 6 (six) study programs (Undergraduate Level) according to the quota decided by the school. The distribution into the study programs is based on, in the priority order, (1) student interest, (2) student's choice consistency, (3) student choice priority, (4) program's quota, (5) GPA (in case of over quota). The annual figure of the number of SEEI students who enters EPE Program at the end of their ITB Common Preparatory Level is presented by Table 1.2.

Table 1.2. Enrollment & Graduation Trends for Past Five Academic Years

Academic Year	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Full-time Students	66	47	46	36	33
Part-time Students	0	0	0	0	0
Student FTE(1)	66	47	46	36	33
Graduates	41	59	67	59	22

Notes: (1)FTE = Full-Time Equivalent, (2)Up to April 2015 Graduation

B. Evaluating Student Performance

Students are continuously evaluated from their first semester in the university until they graduate, normally after eight semester. The student performance evaluation is carried out by course instructors using standard evaluation tools such as exams, quizzes, written assignments, oral presentations, projects, lab assignments, and final project. The proportion for each evaluation tools for deciding the final grade of particular course is decided by the course instructor himself. The course instructors are mainly SEEI faculty members. However, some mandatory university courses and ITB Common Preparatory Level may be provided by the faculty member from other Schools in ITB.

Eligibility for student to graduate from a course or from university is assesed through their, so called ***IP***, which stands for *Indeks Prestasi* (Performance Index). IP is defined

as the average of cummulative grade that considers the number of credits the student has achieved. Only the credits of passed courses are considered for evaluation instead of all courses taken by the students. Student performance is assessed by a letter score representing the grade, as shown in Table 1.3. This index is same for all ITB student from any school, regulated by ITB Rector decree No. 023A/SK/I1.A/PP/2014.

Table 1.3 List of Course Grade System

Letter(s)	Description	Score (per credit)
A	Exceptional	4.0
AB	Excellent	3.5
B	Good	3.0
BC	Satisfactory	2.5
C	Sufficient	2
D	Poor	1
E	Fail	0
T	Pending	-

Score T (Pending) should be administered in one month after the score submission deadline, otherwise it will be automatically converter into E (Fail) by ITB online academic system.

First year SEEI students must complete the ITB Common Preparatory Level of 36 credits (Satuan Kredit Semester/SKS) with IP point at least 2.0 or higher without grade E (failed) or T (pending). The curriculum for this stage is should be finished for one year (two semesters), however, student may take up to 2 (two) years (four semesters) to complete ITB Common Preparatory Level should some problems arise. Failing to finish ITB Common Preparatory Level in two years will make his/her student status in ITB is terminated. Starting from the second year, a student is admitted to one of undergraduate programs in SEEI. Similar to other Undergraduate Programs in SEEI, the Electrical Power Engineering (EPE) program is designed to be completed in 3 (three) years, which cover six semesters study without grade D, E, or T. The maximum period of study allowed by ITB is 6 (six) years starting from enrollment to finish both ITB Common Preparatory Level and Undergraduate Level. The students also have to ensure that no two consecutive semester IP points are below 1.0. If a student fails these IP requirements, their study is terminated.

C. Transfer Students and Transfer Courses

Currently there is no transfer students and transfer courses in EPE. However, in case there is proposal of transfer student to EPE Program, it will strictly follow ITB policy regarding transfer student, as regulated through Rector Decree No.

266/PER/I1.A/PP/2015 for special student admission. Student transfer can be in several schemes, as follows,

1. Student who is transferred from abroad university due to his/her parents are employed abroad by Rep. Indonesia Government.
2. Student who is sent by his/her professional institution to study in ITB under some legal joint agreement between his/her institution and ITB.
3. Student who is sent by partner universities to study in ITB under some legal joint agreement between his/her university and ITB

The acceptance of this transfer student is decided by ITB Rector based on placement test conducted by ITB, which usually consist of psychological test and subject test with interview.

Under such circumstances, EPE Program will acknowledge the credits which is owned by the potential transfer student by following the regulation that is set by ITB. The credit transfer policy is regulated through Rector Decree No. 098/SK/I1.B01/PP/2011. In general this transfer credit policy is applied to students who is joined several programs, such as double degree, student exchange, and transfer student.

To apply credit transfer which is obtained prior admitted as ITB student, the student may apply to the Dean of his/her School by attaching original academic transcript and course syllabus, in case the credits are obtained from abroad universities, additional information regarding the accreditaion status and the rank of the abroad universities should also be attached.

In case the credits are obtained after admitted as ITB student, the student also apply to the Dean after obtained approval from his/her Program Chair and Academic Advisor. Original transcript and course syllabus are also should be attached. In case the credits are obtained from abroad universities, additional information regarding the accreditaion status and the rank of the abroad universities should also be attached.

In both cases, Dean will take the decision under reccommendation of the Program Chair.

D. Advising and Career Guidance

Advising for freshmen on College Life.

The Directorate of Education ITB holds orientation programs for the entering freshmen. These programs comprise three parts. The first part is an introduction to the ITB organization and administration especially the offices related to the registration and student welfare. The Directorate of Education distributes a package of information consist of Guide for College Life, Students Academic Regulation, and a Guide Book on Developing Soft Skills through the co- curricular and extra-curricular activities. The second part is a one day workshop on college life. The aim of this workshop is to help freshmen to cope with their transition from high school to college and kick start in college academic life. The program is designed by professionals.

Senior students mentors are chosen to deliver this workshop in order to ease the material presentation. The mentors are also chosen as meant to be role models for the freshmen. The third part is an introduction to various students' social and professional activities. Here freshmen are introduced to various Student Activity Unit and Student Associations. The university has the Office of Student Affair whose concern is the student welfare and graduate carrier development. Some of the related offices within this institute are the Office for Scholarship and Financial Support, the Office for Student Counseling, and the Carrier Center.

School of Electrical Engineering and Informatics assigns Academic Advisor to monitor freshmen academic performance. Each advisor takes care up to 20 students maximum. The role of these advisors is to advise student in their study both academically and solve unique cases related to the student.

Student academic performance is also monitored by appointed Academic Advisor every semester. Student re-enrollment registration in the beginning semester requires approval from the Academic Advisor regarding course plan that is proposed by the student. This process can be conducted by on-line method through the Si-X system (https://six.akademik.itb.ac.id/). EPE Program Chair also has priviledge to monitor all student academic performance through the Si-X system, therefore Program Chair can generate monitoring short-list of the students that is potentially have future academic problems. In contrast, best-performing students are also can be monitored. These best-performing students may be offered to take the integrated bachelor – master program.

Advising to Choose Program and Design Study Plan.

Students are advised to design a study plan when they start the sophomore year since they will start more specific undergraduate program. To provide brief understanding of the upcoming undergraduate study, students are invited to at least three talks in one semester during their freshmen year, which are in the fourth week of the first semester, in the beginning of the second semester, and in the last week of the second semester. In these talks each of the study program chairs present the curriculum of the programs.

To help freshmen students who need more information regarding upcoming study program, Academic Advisor is playing role to give deeper information to the student in choosing the program. Moreover, the EPE Program Chair and the other faculty members are also available for consultation.

The decision is upon the students themselves. Therefore, the academic advisors counsel the student only on how to choose and not to direct the students for choosing one of the study program. In case of the students have already had some preferences, the advisor usually sends them to other faculty member who are from those preferred program so that they may get more in-depth information.

Re-enrollment Advising.

Re-enrollment registration period for each semester is held two weeks before the lectures period is started. The study plan for each of the student must be approved by his/her academic advisor. The student fills in their study plan on-line form through the Si-X system on the beginning of each semester. The on-line system then sends e-mail notification to notify his/her advisor. The advisor can directly approve or reject the plan. In case of rejection, the system require advisor to write the reason for it.

The Si-X on-line system can work without student and advisor face-to-face meeting. For special circumstances, direct (face-to-face) communications can be conducted. During the ITB Common Preparatory Level, there is scheduled meeting in each semester between students and academic advisors. After that, academic advisors open online interaction with their students. However, students is encouraged to meet with their advisor to discuss their study plan, regardless there is problem or not.

ITB has provided regulation regarding student curriculum advising trough Rector Decree No. 266/PER/I1.A/PP/2015.

Career Guidance.

Academic advisors are available on need basis for career advice. In addition, the students may come to the office of ITB Career Center to seek advice and job opportunities before they are graduated.

To provide the student with industrial experience, the EPE program requires the student to take mandatory **Industrial Experience course**. This course must be conducted for at least two months in industry. It is graded and recorded in the student's transcript. Normally, the students take the industrial experience program during the semester break between the 3rd year and the 4th year in the months of June, July and August.

E. Work in Lieu of Courses

EPE program has one course, i.e. EP4091 Industrial Experience (2 chrs), for awarding credits for work in lieu of courses. EP4091 is a 2 (two) months long real industrialinternship in professional companies which is compulsory to be taken by the students.

The EPE study program provides companies which affirm their willingness to accept student in this 2 months industrial experience programs. Students then apply for the companies through the EPE study program. Based on those applications, the EPE program chair then write formal request letters to the companies to accept the students. Upon finishing their industrial experience program, the students are required to write a formal report within 30 days. The report must covers at least the information regarding the managerial structure of the company, the job assigned to the student, and how the students do the task assigned to them.

F. Graduation Requirements

The degree awarded is *Sarjana Teknik Tenaga Listrik* in Bahasa Indonesia or Bachelor of Science (BS) in Electrical Power Engineering. A student is graduated if:

(1) The total of 144 minimum credits (Undergraduate level including ITB Common Preparatory level) in accordance to EPE program curriculum is achieved, and

(2) A final project oral examination must be passed, and

(3) The IP requirements on student performance evaluation are met.

This requirements is regulated by ITB through Rector Decree No. 266/PER/I1.A/PP/2015. The program chair will conduct a graduation checking to ensure that the students have strictly fullfil the curriculum requirements. After graduation checking is finished, then program chair will propose the name of students who graduate to be formally legalized through SEEI graduation meeting lead by the Dean. The number of graduates of EPE is shown by Table 1.2 for the last five years.

A list of a number of graduates who have been recruited by various companies and whohave continued to postgraduate studies and a list of a number of achievements of EPE students are presented in Appendix E.

G. Transcripts of Recent Graduates

The academic transcripts of EPE Program present students academic records of all courses they have taken and passed. The transcript states the awarded degree and achieved IP. The name of the program is designated on the transcript.

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

A. Mission Statement

Institut Teknologi Bandung (ITB) is an autonomous state university. ITB vision and mission are prescribed in the Senate Decree No. 09/SK/I1-SA/OT/2011. ITB vision statement is ***"To become an outstanding, distinguished, independent, and worldwide recognized university to lead changes toward the prosperity of Indonesia and the world".*** While ITB mission statement is ***"To discover, share and apply science, technology, art and humanity, as well as to develop outstanding human resources to best serve Indonesia and the world"***

The ITB Academic Senate prescribes for education, trough ITB Senate Decree 10/SK/I1-SA/OT/2012 on *Harkat Pendidikan*/The Essence of Education that: ***"The essence of education in ITB is to educate the student to have meaningful knowledge for living, to be independent, to respect professional/society ethics, and to be competent to contribute to society and workplace".*** It also specifies that the objectives of education in ITB is to have all the graduates of ITB to be able

1. To contribute actively in their chosen profession
2. To pursue and to complete higher/more advance education
3. To show leadership and pioneering in the improvement of society

The relation of ITB mission to PEO and curriculum structure is described on ITB Senate Decree 11/SK/I1-SA/OT/2012. The diagram in Figure 2.1 shows this relationship.

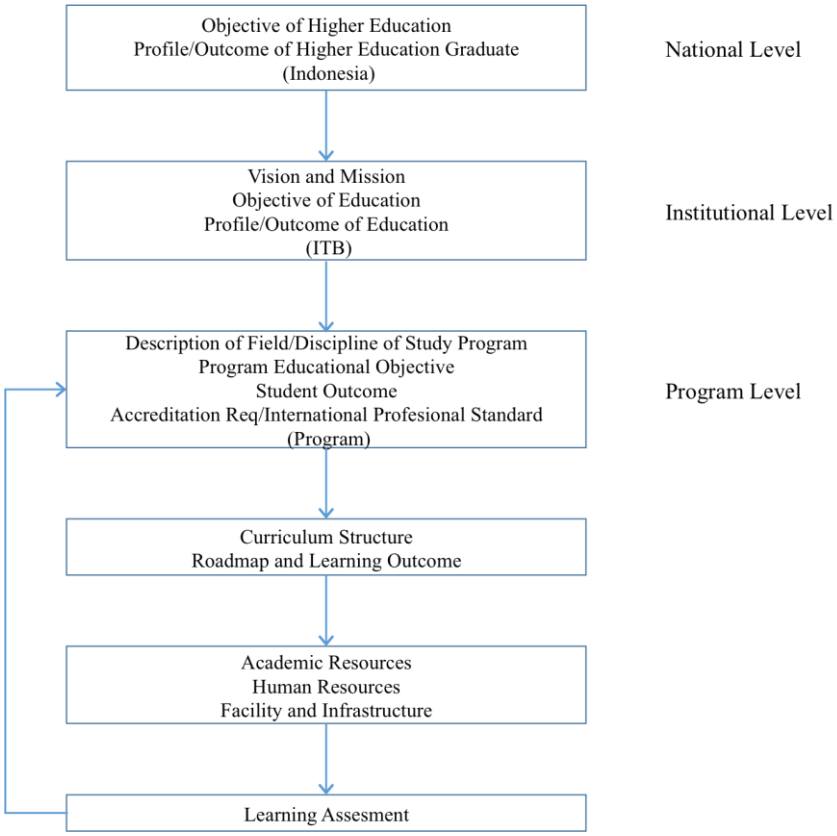


Figure 2.1 Relationship between the national higher education policy, institutional education objectives, and program level PEO and curriculum structure.

B. Program Educational Objectives

Initially, Advisory Board held a meeting with the SEEI for reviewing PEO for all of its programs March 4th, 2011. The Advisory Board provided input regarding aspects of the objectives that should receive emphasis such as leadership, active role in transforming Indonesia, professional and personal growth, and expressed approval of the Program Educational Objectives. The proposal then brought before the leadership of the SEEI to obtain approval including initial PEO of EPE Programs. After three years, The same PEO of EPE Program had been included in the 2013 Curriculum Document since in that time PEO was still considered up to date. This 2013 curriculum document was formalized by ITB Academic Senate No. 11/SK/I1-SA/OT/2013. After three years, since 2016, the PEOs has been brought to the Advisory Board and External Quality Assurance Committee for discussion. In the last meeting on April 6th, 2017, all parties were agreed to slightly revise the PEOs of EPE Program. This changes then proposed to the Dean of SEEI before later proposed to the SEEI Academic Senate. SEEI Academic Senate then accepted this changes through Senate Decree No. 024/SK/I1.C07.3/PP/2017.

Program educational objectives of the EPE Program are as follows.

1. Our graduates will have successful careers in his/her profession, especially in the field of electrical power engineering

2. Our graduates will be able to pursue higher education or continuing professional development
3. Our graduates have active leadership and become pioneer for serving his/her community

Program Educational Objectives will be published on the Electrical Power Engineering Program website. The objectives are also mentioned in the SEEI undergraduate brochure.

C. Consistency of the Program Educational Objectives with the Mission of the Institution

The objectives of the EPE program are consistent with the mission of the institution that is:

"To discover, share and apply science, technology, art and humanity, as well as to develop outstanding human resources to best serve Indonesia and the world"

The mission of ITB is further derived into the objectives of education in ITB as stated earlier.

1. The first PEO of EPE program is aligned with the first objective of education in ITB, that is to produce successful graduate in engineering field.

2. The second PEO of EPE program is aligned with the second second objective of education in ITB that is to produce quality graduate to pursue higher/advance education.

3. The third PEO of EPE program is consistent with the third objective of education in ITB, that is to produce graduate with leadership who is able to improve the society through an active role in industry, government or education.

In general, the EPE program satisfies the institution's mission by providing a quality education that will prepare the graduates in support of the needs of the nation. The objectives of the EPE program are also consistent with the mission of the School of Electrical Engineering and Informatics, which are:

1. To provide higher education and continuing education in Electrical Engineering and Informatics by using communication and information technology toward creative communities;
2. To maintain the state-of-the art of Electrical Engineering and Informatics through innovative research activities;
3. To disseminate science, technology and knowledge of Electrical Engineering and Informatics through its alumni, partnership with and through activities of community service program to form knowledgeable and technological society.

The EPE program satisfies the School of Electrical Engineering and Informatics mission in providing an Electrical Power Engineering education of good quality. The graduates of the EPE program will have a capacity to pursue postgraduate study and serve the needs of the community and the industries.

D. Program Constituencies

Our constituency includes employers, alumni, and faculty, but feedback may be obtained from students, alumni, employers, external quality assurance committee, and the SEEI Advisory Board. The employers are chosen as constitutent since that they are direct user of students who are graduated from EPE Program. Alumni also important constituenst since that they feel directly the objectives achievement of EPE Program in their current career, moreover they also bring various professional experiences to provide suggestion to improve the program quality.

Although student is not our constituence, the student feedback is needed to assesses how well the program is running to meet the objectives. To obtain feedbacks from the student, SEEI holds faculties and graduating students gathering prior every graduation day in which graduating students are encouraged to express their comments and feedback on their education process and experience within the school. The EPE program graduating students may raise comments on any field of education process, ranging from the classrom activities to the PEOs of the EPE program during this events.

In 2007 SEEI established an official Advisory Board. The advisory board represents several elements of our constituency that have gained considerable success and experience outside of SEEI programs. The Advisory Board consists of alumni, industry leaders, and practical engineers. The current Advisory Board consists of:

1. Dr. Herman Darnel Ibrahim (National Energy Council of Indonesia, Chair)
2. Ir. Ary Mochtar Pedju, M.Arch (PT Incona Inti Industri)
3. Ir. Yani Panigoro (PT Medco Holding)
4. Ir. Rinaldi Firmansyah, MBA
5. Ir. Yana S. Raharja, MM (PT QIMtronics)
6. Ir. Arief Yahya, M.Sc (Ministry of Tourism & Culture)
7. Ir. Irfan Setiaputra (PT. Ciptakridatama Tbk)
8. Ir. Abdul Hamid Batubara (PT. Chevron Pacific Indonesia)
9. Ir. Nur Pamudji, M.Sc (PT PLN)
10. Dr. Dedi S. Priatna (Bapenas Indonesia)
11. Prof. Ronnie Ward (Texas A&M University, USA)
12. Ir. Rizkan Chandra, MBA (PT. Semen Indonesia Tbk)
13. Prof. John Choi, Ph.D (Sangmyung University Korea)
14. Dr. Ir. Jaka Sembiring, M.Eng (SEEI)
15. Prof. Adrian Venema

Since 2017 EPE Program also establishes External Quality Assurance Committee. This external committee consist of alumni, government, industry leaders, and practical engineers who specifically works on the field of Electrical Power Engineering. This

committee is intended to work synchronously with the SEEI Advisory Board. The current External Quality Assurance Committee members are,

1. Ir. Wisnu Kuncoro, M.Sc. (PT. Krakatau Steel (Persero))
2. Dr. Andika Prastawa (BPPT)
3. Ir. Bambang Praptono (PT. Hexa Integra Electrica)
4. Ir. Haryanto W. S., MM (PT. PLN (Persero))
5. Ir. Adi Sufiadi Yusuf A., M.Eng. (PT. LEN Industri (Persero))

Both the Advisory Board and External Quality Assurance Committee brings diverse backgrounds and experiences to our discussions, which includes the program objectives for our undergraduate educational program, i.e. the EPE program. The Advisory Board regularly meets every semester to discuss issues related to SEEI and its programs.

E. Process for Establishing Program Educational Objectives

Formally the process for establishing PEO is based on Figure 2.1. It should involves mission, objectives, and outcomes of education in ITB. Furthermore, those mission, objectives, and outcomes must follow the objectives of higher education in national level.

The PEO are intended to be broad statements of attributes to be achieved by our graduates. The definition of PEO furthermore formalized in an official meeting attended by the Advisory Board, External Quality Assurance Committee, the school, and the program. The Objectives can be assessed on a regular basis, typically three years, since at institutional level, ITB has implemented continuous improvement policy.

Regular assesment of Objectives was conducted in 2016, after three year from the previous 2013 version, to propose slight changes in the objectives definition. This changes is to put more emphasis in the graduate as the object of the objectives. First discussion was held in April 8th 2016, for EPE Program it is suggested to propose exact wording regarding graduate as the object, then conduct next Advisory Board Meeting to discuss the final new definition of Objectives. The EPE Program then proposed establishment of External Quality Assurance Committee to help resolve this problem to the SEEI.

In the beginning of 2017, SEEI approved the request of establishment of External Quality Assurance Committe. Then in April 6th, 2017, a meeting between SEEI Advisory Board, EPE External Quality Assurance Committee, SEEI Dean, and EPE faculty member was held to follow up the last situation. The result of the meeting was The Advisory Board and External Quality Assurance Committee agreed the new definition of EPE Objectives. The result then brought before the SEEI to obtain approval. Once it is approved, the proposal is brought before the SEEI senate to be reviewed and commented and the SEEI senate expressed approval of the EPE Program Educational Objectives.

F. Process for Review of the Program Educational Objectives

At institutional level, ITB has implemented continuous improvement policy, therefore the review of the program and evaluation can be conducted any time. Review of PEOof the EPE program is essential to assess the relevancy of PEO with the needs of employers from our graduates and also our alumni interest in pursuing higher education.

For that purpose, the following ways to assess the relevancy of PEO were used:

1. ITB tracer study (annually) to know the distribution of the career of the alumni in three years after graduation;
2. Graduate exit survey
3. Alumni survey
4. Employer survey

TRACER STUDY RESULT

From 2014 tracer study and 2015 tracer study which have been conducted by ITB, some relevant results are established and shown in the following figures. The tracer study addresses the student that has been graduated three years before. For example, the 2014 tracer study addressed the students that graduated in 2011, while the 2015 tracer study addressed the students that graduated in 2012.

The first tracer study that are analyzed is the relevancy between the education they obtained from EPE program and their following career. The result from this survey above shows that the respondents career is mostly relevance with the study. Both the 2014 tracer study and 2015 tracer study confirm this result.

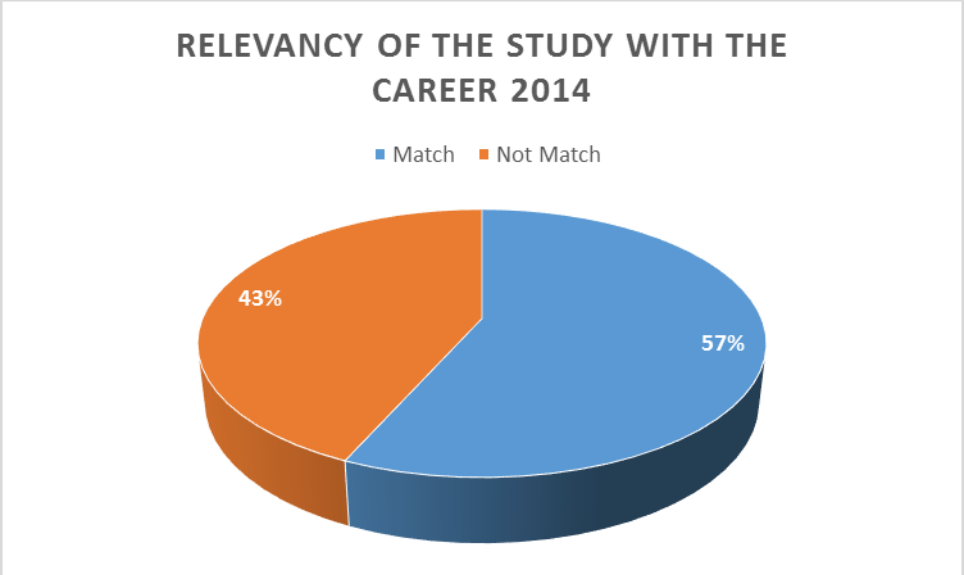


Figure 2.2 Tracer study 2014 results on relevancy of the study with graduate's career

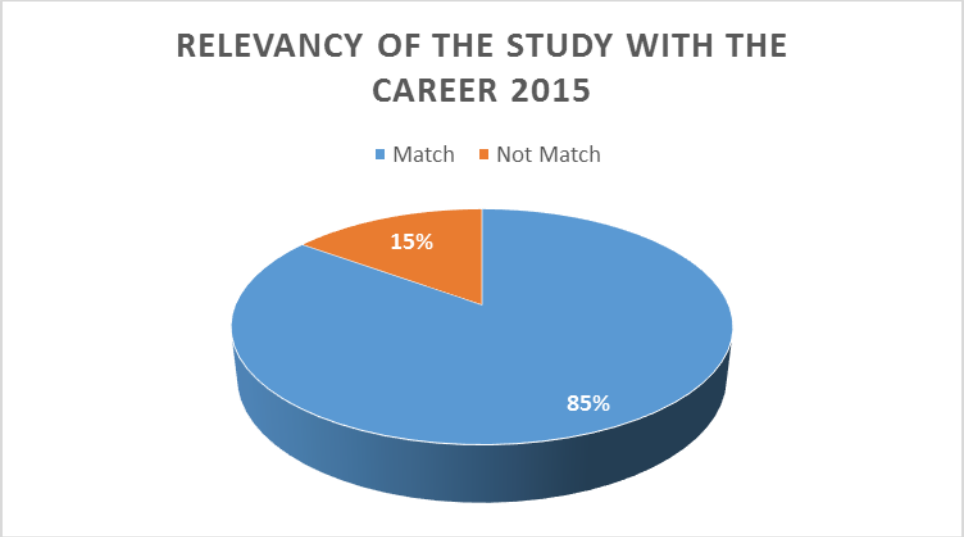


Figure 2.3 Tracer study 2015 results on relevancy of the study with graduate's career

The second result from the survey is an important fact about what our graduates did after finish their undergraduate degree. The result shows that most of our graduates works as employee after they finish their undergraduate degree, as shown in 2015 Tracer Study result.

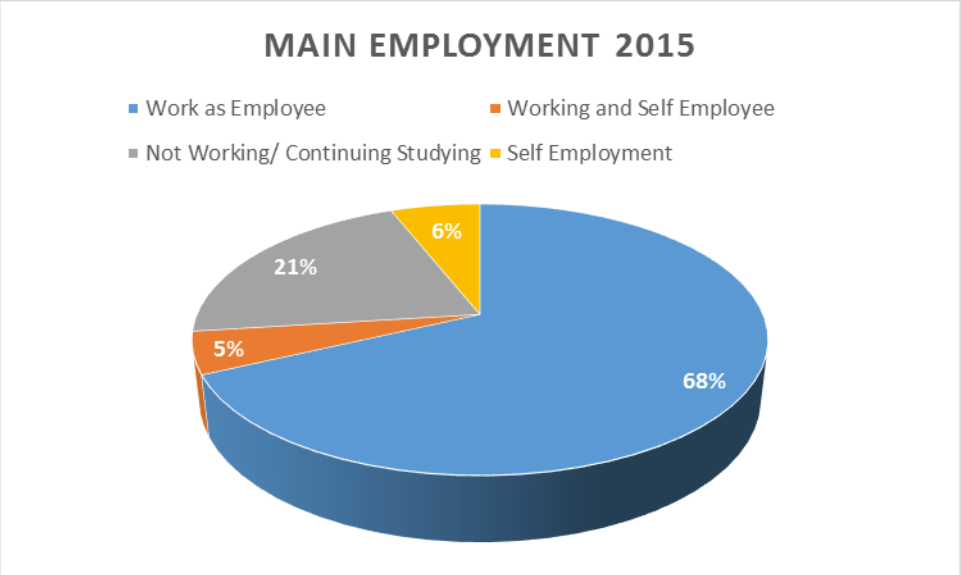


Figure 2.4 Tracer study 2015 results on employment of graduates

The third result is about the companies that hire our graduates. Most of our graduates work in international companies for company origin category and private company for company ownership category in the tracer study 2014. But, in the tracer study 2015, most of our graduates work in National companies for company origin category and private company for company ownership category.

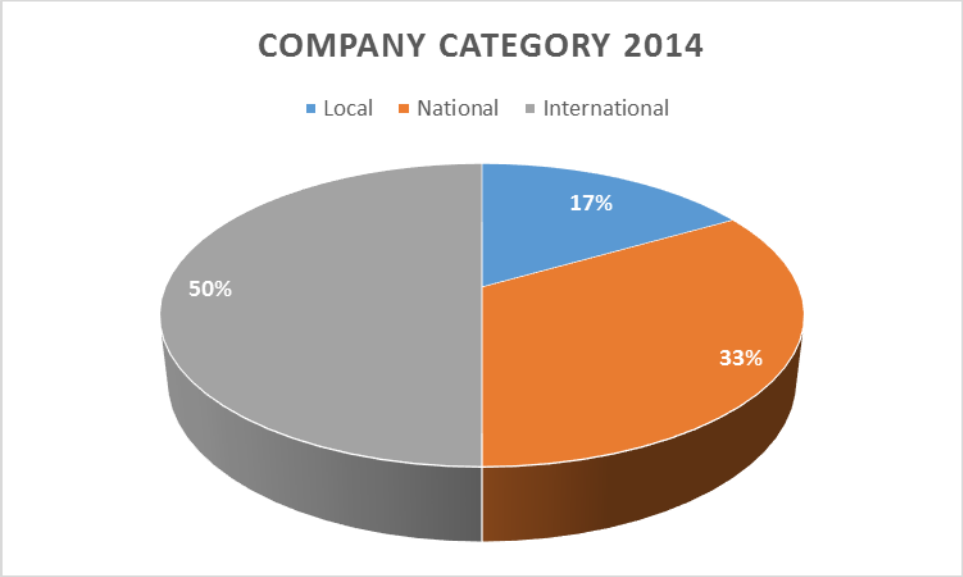


Figure 2.5 Tracer study 2014 results on company category

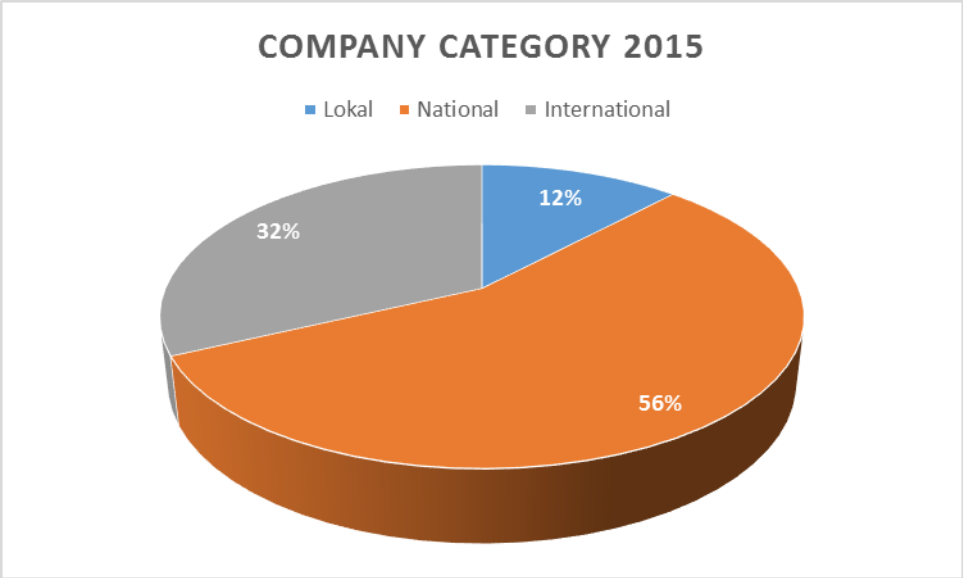


Figure 2.6 Tracer study 2015 results on company category

The fourth result is about the companies profile of graduate's recruiter. Most of our graduates work in Government Instance. It shows in tracer study 2014 and 2015 that the percentage of the Government Instance is more than 50%.

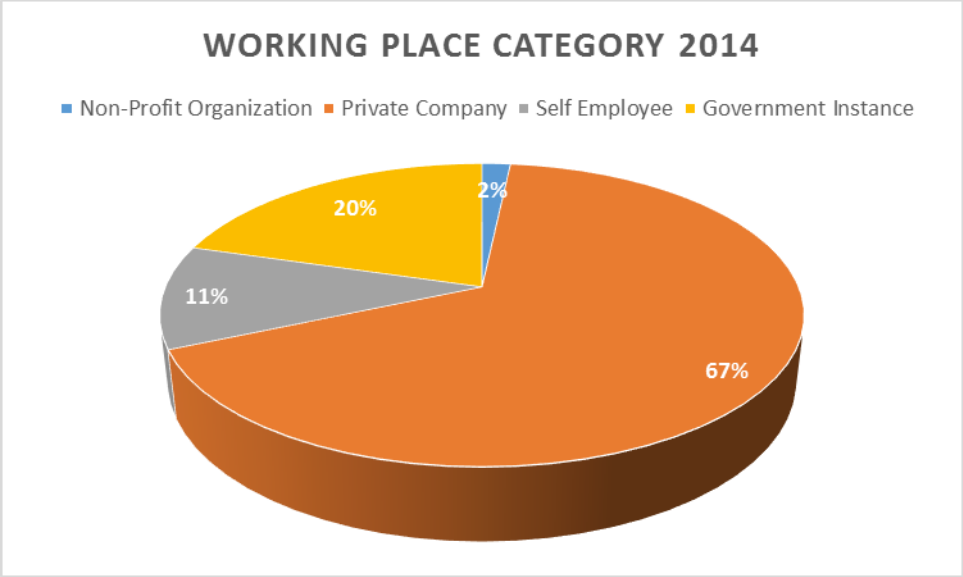


Figure 2.7 Tracer study 2014 results on company profile of graduate's recruiter

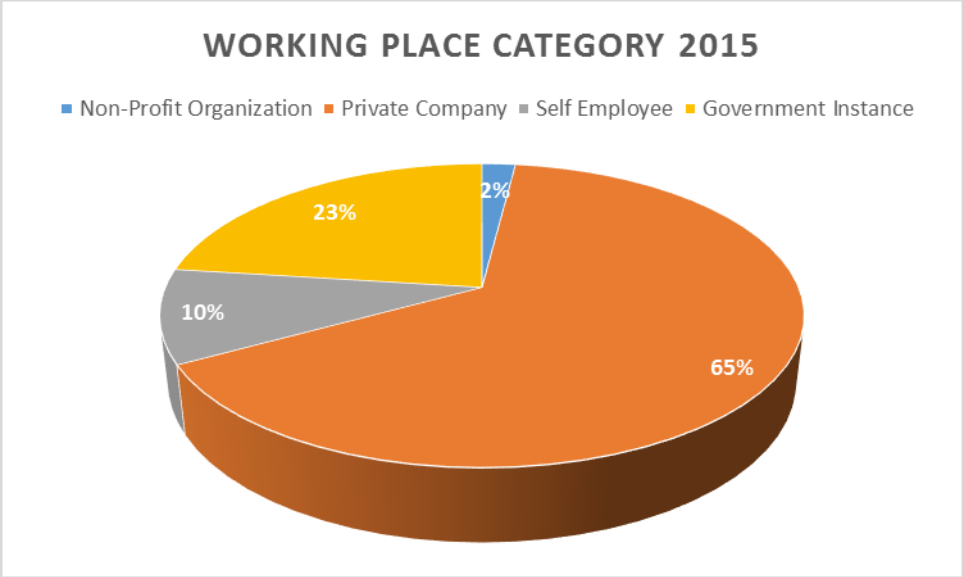


Figure 2.8 Tracer study 2015 results on company profile of graduate's recruiter

The fifth result shows us that our graduates have a high level on foreign language ability, 3.51 out of 4.00 in the trace study 2014. Then, the ability increase to 3.57 based on data in trace study 2015.

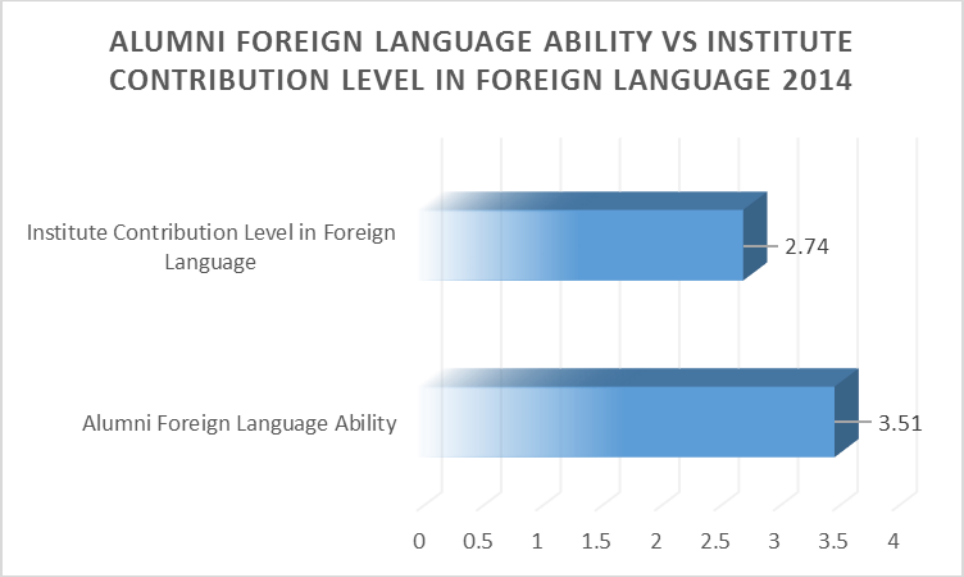


Figure 2.9 Tracer study results on institute contribution and alumni ability on foreign language

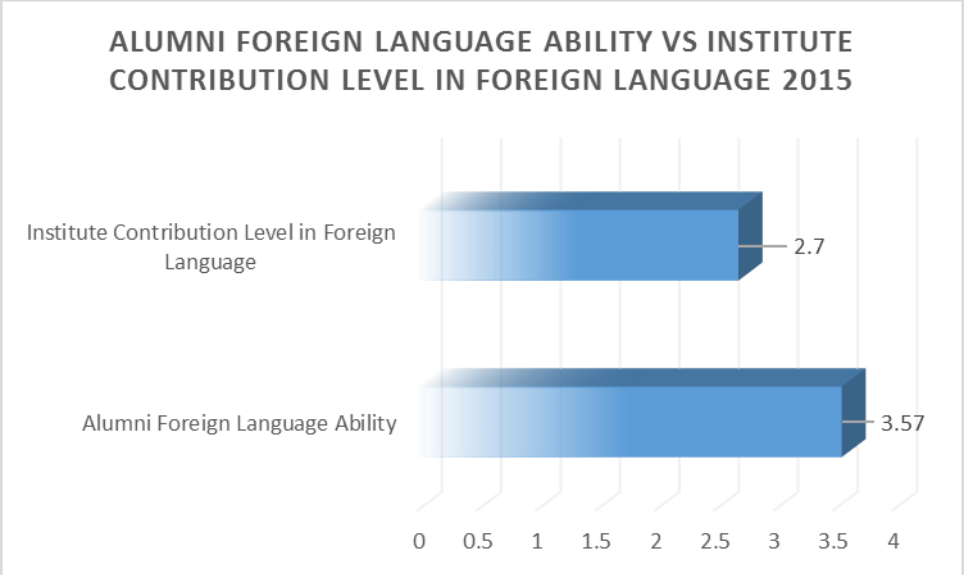


Figure 2.10 Tracer study results on institute contribution and alumni ability on foreign language

GRADUATE EXIT SURVEY RESULT

We conducted the graduate exit survey in evaluating EPE program. This survey is to get the impression from the newly graduate student to the program Objectives. The graduate is expected to relate the EPE Program Objectives to their readiness for professional world ahead.

The survey consist of questions:

Graduates of the EPE program at ITB should be able to utilize the knowledge gained from their academic program to

1. Solve important problem in the society as valuable, productive engineers (PEO 1)
2. Enter and succeed in graduate program (PEO 2)
3. Have leadership or active roles in developing industries and other sectors in Indonesia or Asia Pacific region (PEO 3)

PEO 1

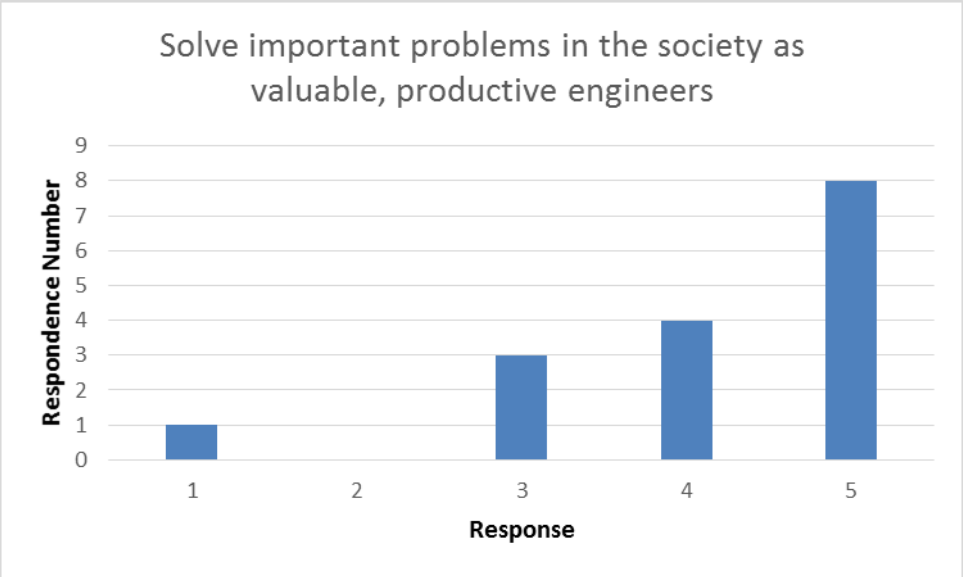


Figure 2.11 Graduate Exit survey results related to the first PEO in 2015 graduation year
(1: strongly disagree, 5: strongly agree)

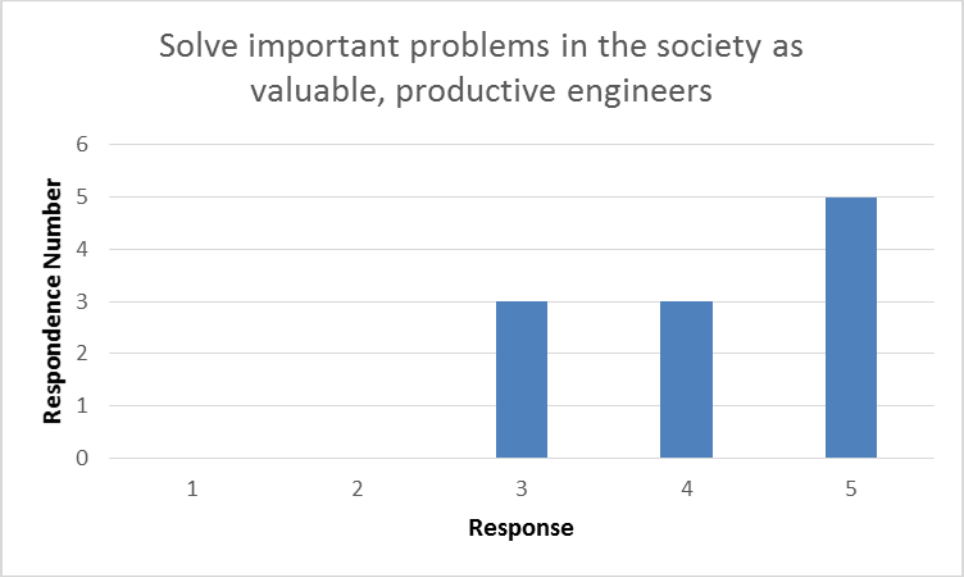


Figure 2.12 Graduate Exit survey results related to the first PEO in 2016 graduation year

(1: strongly disagree, 5: strongly agree)

Both survey results show that most of our graduate are confidence with the knowledge and skills they received from the EPE Program will help them to achieve success in engineering field ahead

PEO 2

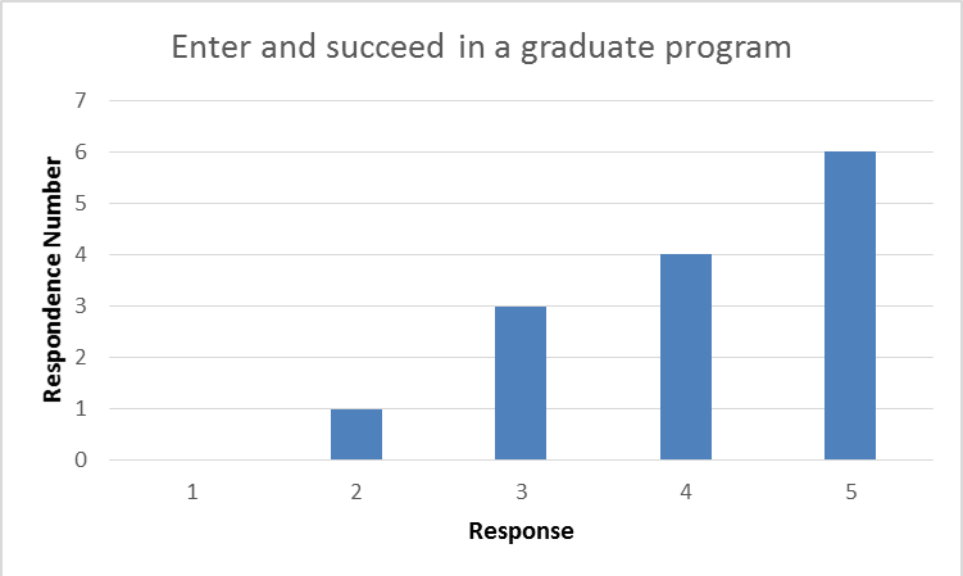


Figure 2.13 Graduate Exit survey results related to the second PEO in 2015 graduation year
(1: strongly disagree, 5: strongly agree)

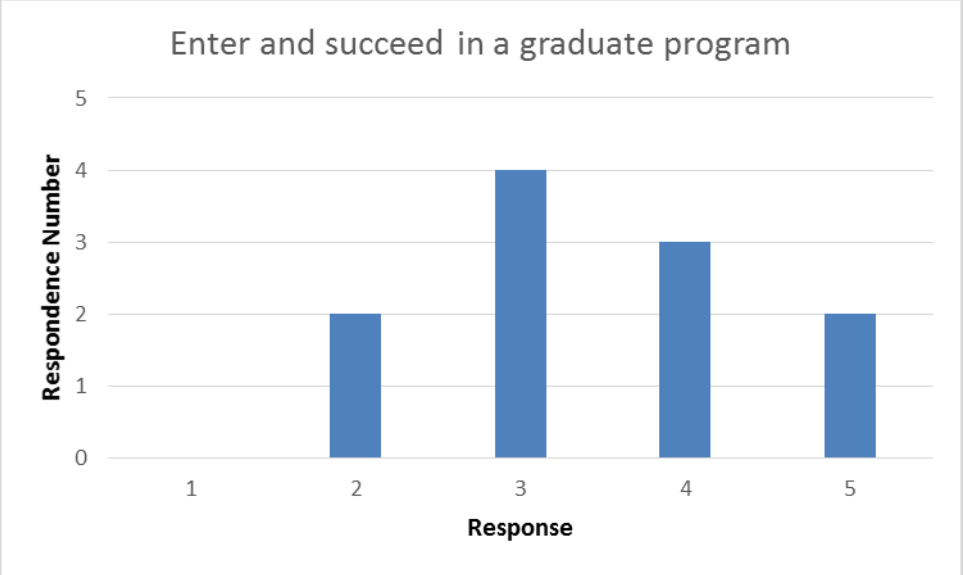


Figure 2.14 Graduate Exit survey results related to the second PEO in 2016 graduation year
(1: strongly disagree, 5: strongly agree)

Both surveys show that the graduates are confident that the knowledge received from EPE Program is capable to be used as the fundamental for continuing graduate study. Slight decrease of the agreement was found in the 2016 graduation year survey, but this can be interpreted that probably the 2016 graduates have more interest in industrial rather than directly engange with graduate study.

PEO 3

Figure 2.15 Graduate Exit survey results related to the third PEO in 2015 graduation year
(1: strongly disagree, 5: strongly agree)

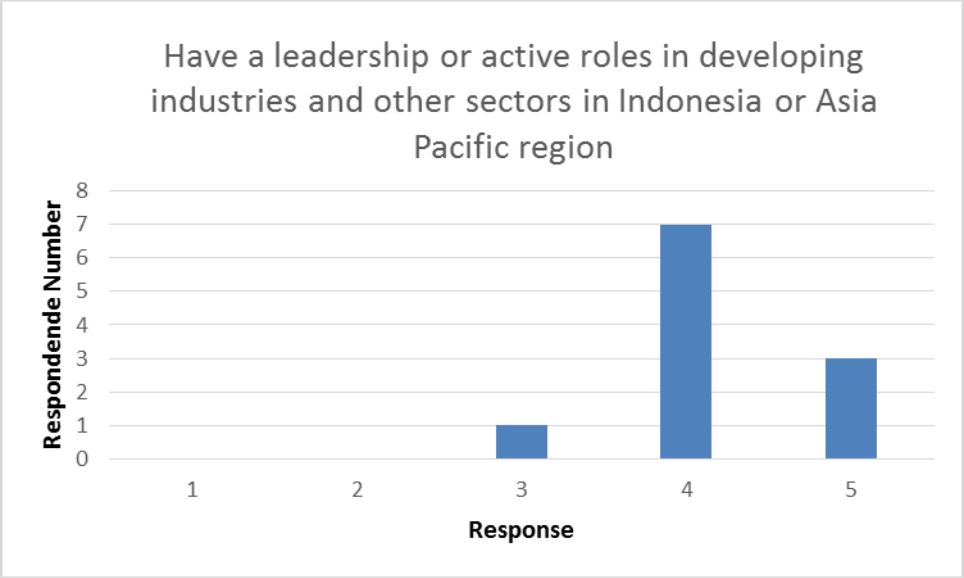


Figure 2.16 Graduate Exit survey results related to the third PEO in 2016 graduation year
(1: strongly disagree, 5: strongly agree)

Both surveys shows that our graduates have confidence that they will able to take leadership role in the field that they choose ahead.

ALUMNI SURVEY RESULT

The same survey question was conducted to the alumni who already has industrial experience. The total respondents are 113 with the proportion that 59% works in engineering fields, and 56% works ini national level company.

The survey consist of questions:

Graduates of the EPE program at ITB should be able to utilize the knowledge gained from their academic program to:

1. Solve important problem in the society as valuable, productive eengineers (PEO1)
2. Enter and succeed in graduate program (PEO 2)
3. Have leadership or active roles in developing industries and other sectors in Indonesia or Asia Pacific region (PEO 3)

PEO 1

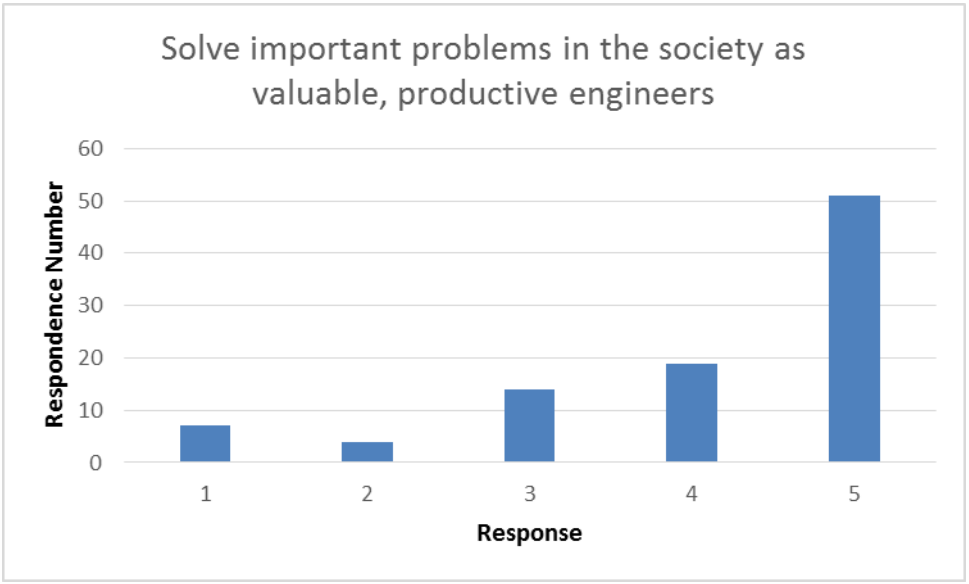


Figure 2.17 Alumni survey results related to the PEO 1 (1: strongly disagree, 5: strongly agree)

The survey shows that the EPE education successfully achieve the objective on PEO 1.

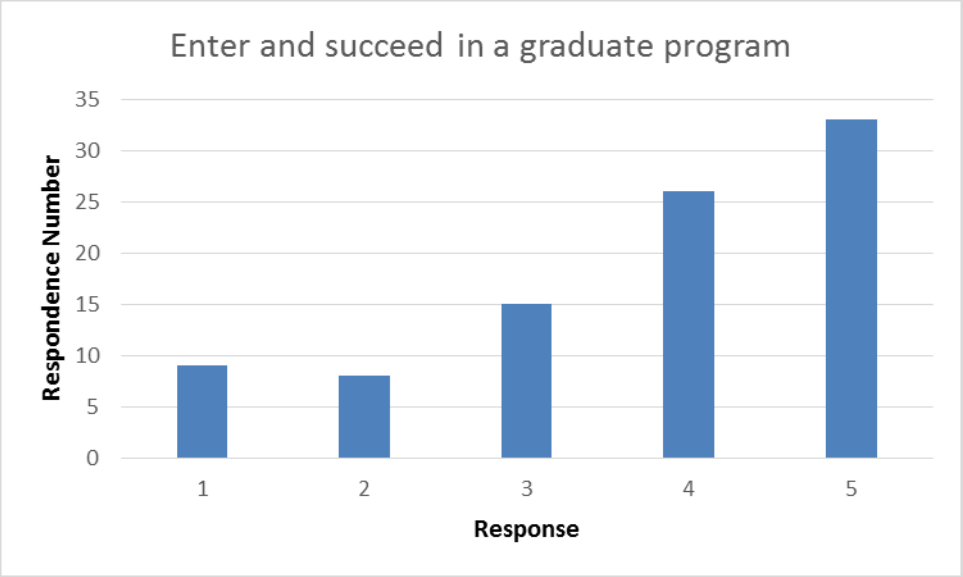


Figure 2.18 Alumni survey results related to the PEO 2
(1: strongly disagree, 5: strongly agree)

The survey shows that the EPE education successfully achieve the objective on PEO 2.

Figure 2.19 Alumni survey results related to the PEO 3
(1: strongly disagree, 5: strongly agree)

The survey shows that the EPE education successfully achieve the objective on PEO 3.

EMPLOYER SURVEY RESULT

We conduct similar question from the employer point of view to asses the PEO achievement. However, for this time the participation level of the employer is very low

to fill this survey. We will conduct another employer survey in 2018, to asses the achievement during 2017.

The employer survey shows that the employer has the impression that the alumni of EPE program is able to show technical ability, show curiosity to new field, has good leadership and communication skill.It means that the PEO is relevant to the need of the employer

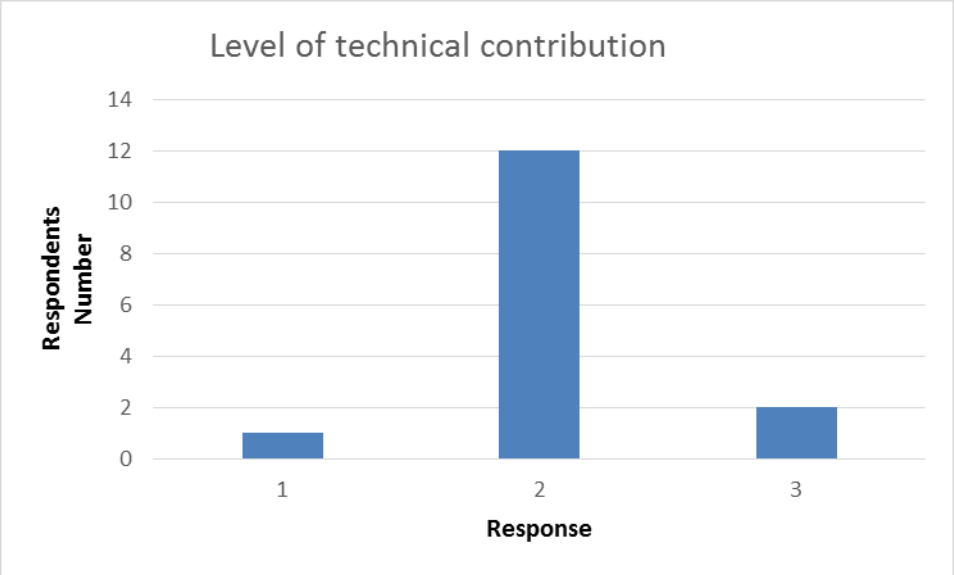


Figure 2.20 Employer survey results related to the first PEO (1: below expectation, 2: meet expectation, 3: exceed expectation)

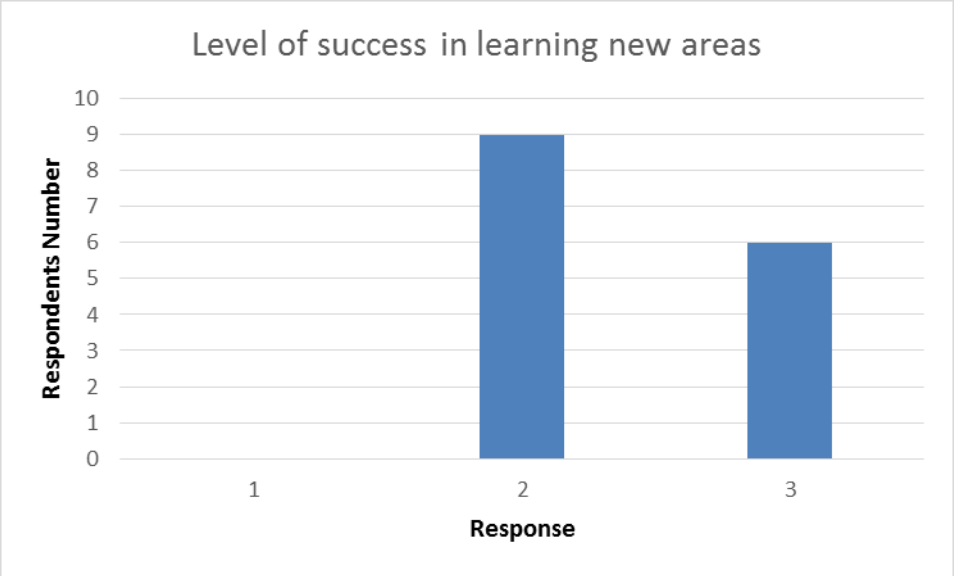


Figure 2.21 Employer survey results related to the second PEO (1: below expectation, 2: meet expectation, 3: exceed expectation)

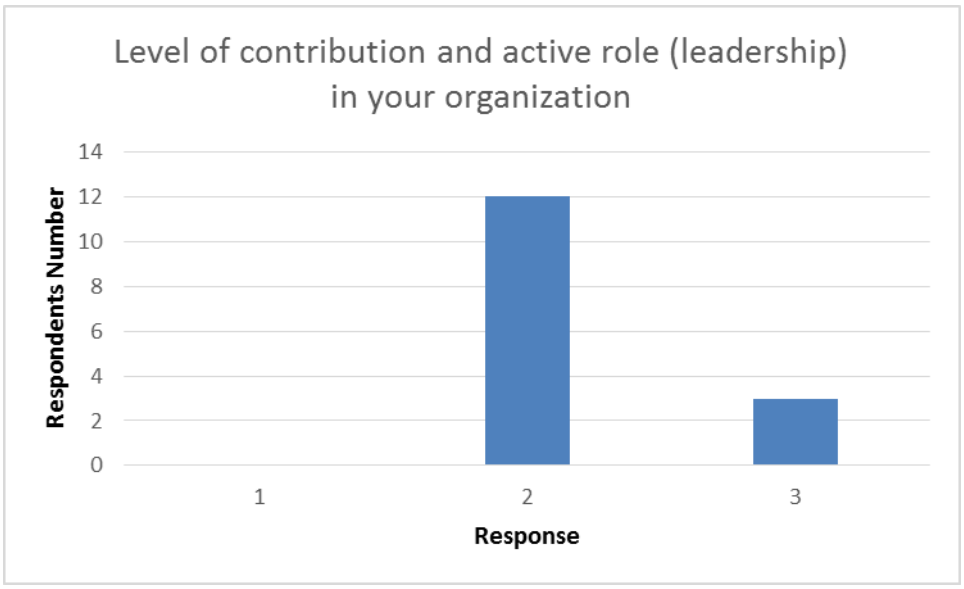


Figure 2.22 Employer survey results related to the third PEO a (1: below expectation, 2: meet expectation, 3: exceed expectation)

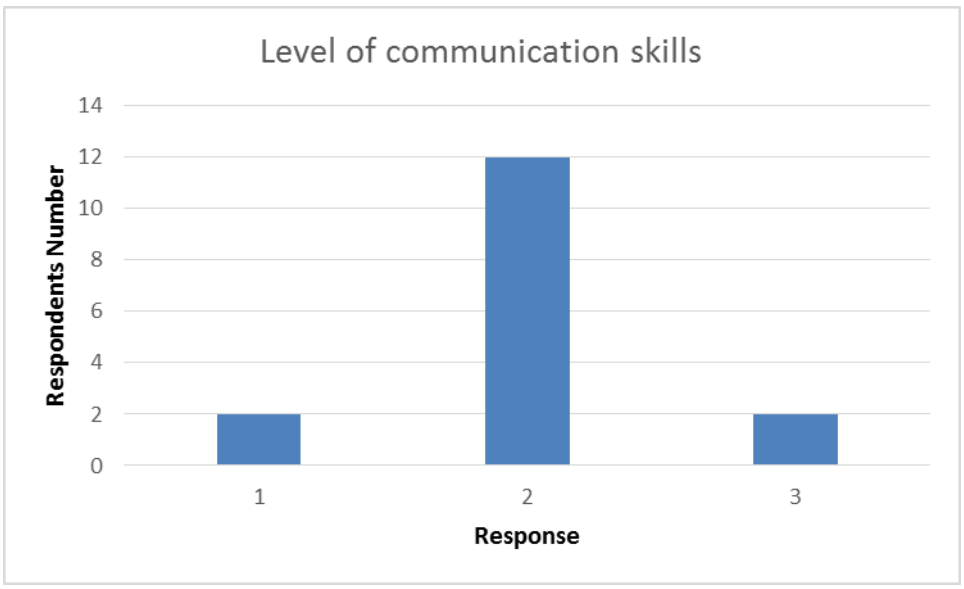


Figure 2.23 Employer survey results related to the third PEO b (1: below expectation, 2: meet expectation, 3: exceed expectation)

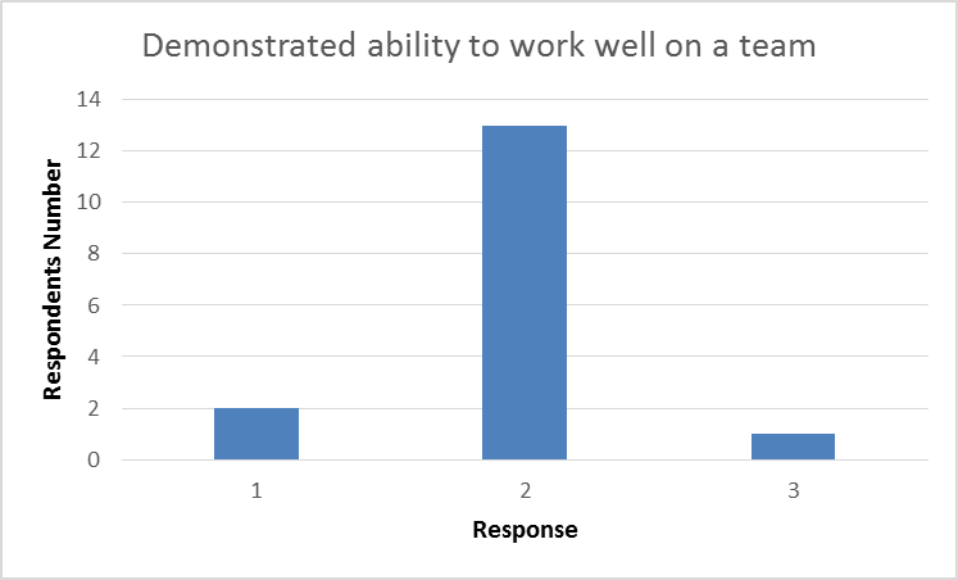


Figure 2.24 Employer survey results related to the third PEO c (1: below expectation, 2: meet expectation, 3: exceed expectation)

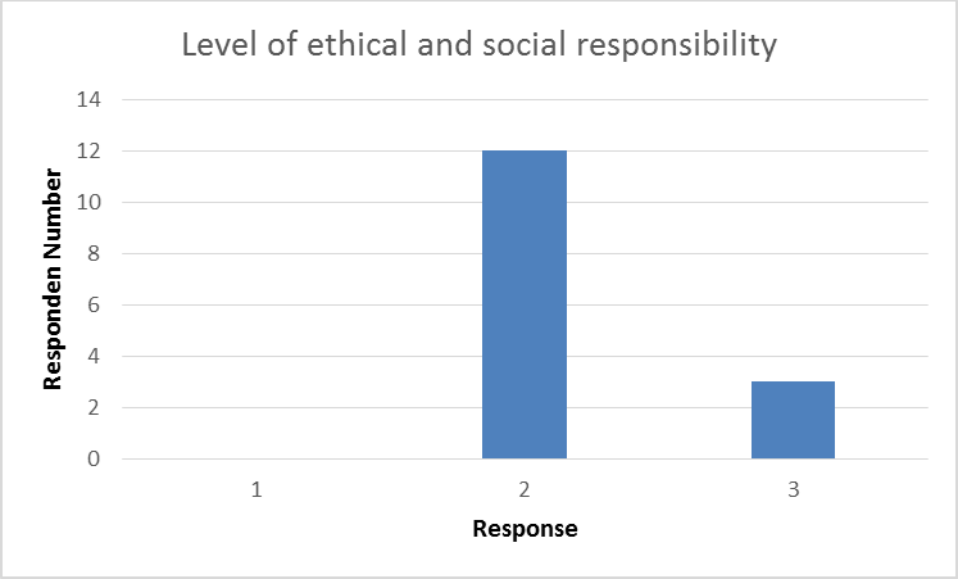


Figure 2.25 Employer survey results related to the third PEO (1: below expectation, 2: meet expectation, 3: exceed expectation)

CRITERION 3. STUDENT OUTCOMES

Process for Establishing and Revising Student Outcomes

Institut Teknologi Bandung (ITB) had a regular period of 5 (five) years for a university wide revisit of curricula for all its academic programs to keep them relevant with current needs, developments, and context. The latest curricula updates took place in 2013 after having evaluated the 2008 ITB curricula. However, currently ITB has implemented continuous improvement policy which allows the review of the program and evaluation to be conducted at any time. The undergraduate program in Electrical Power Engineering (the EPE program) took that opportunity to get an improved EPE curriculum that firstly applied in the 2013/2014 academic year. In principle, there was no major changes in the 2013 EPE curriculum and the same student outcomes are maintained. There were, however, necessary adjustments for improvement and for meeting curricula requirement set by SEEI or ITB.

A. Student Outcomes

The student outcomes of the EPE program is committed to providing an educational experience in which students completing our program will have demonstrated the following student outcomes: as shown in Table 3.1.

Table 3.1 EPE Student outcomes

	Student outcomes
a	An ability to apply knowledge of mathematics, science, and engineering
b	An ability to design and conduct experiments, as well as to analyze and interpret data
c	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d	An ability to function on multi-disciplinary teams
e	An ability to identify, formulate, and solve engineering problems
f	An understanding of professional and ethical responsibility
g	an ability to communicate effectively
h	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i	A recognition of the need for, and an ability to engage in life-long learning
j	A knowledge of contemporary issues
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

These student outcomes are documented and published in our website and flyer. Table 3.2 presents the mapping of student outcomes onto the courses throughout the curriculum of the EPE program.

Table 3.2 Student Outcomes Roadmap in EPE program

Student Outcomes	Freshmen (1st) Year		Sophomore (2nd) Year		Junior (3rd) Year		Senior (4th) Year	
	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester
a	MA1101(S), FI1101(S), KI1102(S), KU1101(M), KU1072(M)	FI1201(S), KI1202(S), EL1200(S), MA1201(S), IF1210(S), KU1201(M)	EL2001(S), MA2072(S), EP2091(S), EL2142(S), MS2041(S)	MA2074(S), EL2006(S), EL2005(S), EP2076(S), EP2094(S)	EP3071(S), EP3073(S), EP3095(S), EP3075(S),EL3015(S)	EP3070(S), EP3072(S), EP3074(S), EP3076(S), EP3000(S)	EP4096(S), EP4071(S), EP4073(M), EP4077(S)	EP4099(S), EP4070(S), XXMANJ(S), EP4072(S), EP4074(S), EP4075(S), EL5275(S), EL5078(S), EP4079(S), EL5174(S), EL5079(S)
b	FI1101(M),KI1102(M)	FI1201(M), KI1202(M)	EL2101(S), EL2142(M)	EL2205(S), EP2076(M)	EP3171(S)	EP3172(S)		
c	KU1101(M)	KU1201(M)		EP2076(S)	TI3004(S)	EP3000(M), KU206X(M), EP3070(S), EP3076(S)	EP4071(M), EP4077(S), EP4096(M), XXLING(M)	EP4074(M), EP4079(S), EP4099(M), EP4070(S), EL5079(M)
d	KU1001(S)	KU1011(S)	EL2142(M)	EP2076(M)		EP3076(M)	EP4096(M), EP4071(S)	EP4072(M), EP4074(M), EP4091(M), EP4099(M), EP4070(M), XXMANJ(M), EP4050(M)
e	MA1101(M), FI1101(M), KU1101(M), KU1072(M), KU102X(M)	MA1201(M), FI1201(M), IF1201(M), KU1201(M), EL1200(M)	MA2072(S), EP2091(M), EL2001(M), EL2142(M), MS2041(M)	MA2074(S), EL2006(S), EP2094(M)	EP3071(S), EP3073(S), EP3095(M), EP3075(S), TI3004(M), EL3015(M)	EP3070(M), EP3072(S), EP3074(S), EP3076(M)	EP4096(S), EP4071(S), EP4077(S), XXLING(M)	EP4099(S), EP4070(S), EP4072(S), EP4074(S), EP4075(S), EL5275(S), EL5078(S), EP4079(S), EL5174(S), EL5079(S)
f	KU1101(M), KU1001(M), KU1072(M)	KU1201(M), IF1210(M)		KU2071(M)	EP3171(S)	EP3074(M), EP3172(S), KU206X(S)	EP4096(M), EP4071(S)	EP4091(S), EP4074(M), EP4099(M), EP4090(S), EP4193(S)
g	KU102X(S)	KU1011(S)					EP4096(S)	EP4091(S), EP4099(S), XXMANJ(M),EP4050(M), EP4193(S)
h	KU1101(L), KU1072(M)	KU1201(L), IF1210(M)		KU2071(M)	TI3004(M)	EP3070(M)	EP4071(M), EP4073(M), XXLING(S)	EP4090(S), XXMANJ(S), EP4050(S), EL5275(S), EL5079(M)
i	KU1101(M)					EP3076(M), KU206X(S)	EP4096(M), EP4073(M)	EP4091(M), EP4099(M)
j	KU1101(L), KU102X(L)	KU1201(L)			EP3095(M)		EP4096(M), EP4073(S), EP4077(M)	EP4091(M), EP4072(M), EP4075(M), EP4090(M), EP4193(M), EP4099(M), EL5078(S), EL5174(M)
k	KU1072	EL1200(M), IF1210(L)	EL2001(M)	EP2094(S)	EP3071(M), EP3073(S), EP3075(M), EP3171(S)	EP3072(M), EP3070(M), EP3172(S), EP3000(M)	EP4096(M), EP4077(M)	EP4075(M), EP4079(M), EP4099(M)

Remarks : S for Strong relation; M for Medium relation; L for Low relation

B. Relationship of Student outcomes to Program Educational Objectives

The program curriculum was designed with periodic reviews to ensure the attainment of the established program educational objectives and student outcomes. Table 3.3 presents the relationship between the Electrical Power Engineering Program Outcomes to the Program Educational Objectives.

Table 3.3 Relationship of Student outcomes to Program Educational Objectives

Student Outcome (abbreviated)	**Program Educational Objectives**		
	(1) Succes in Career	(2) Continue to Learn Professionally	(3) Community serving and leadership
a) Apply Math, Science, Engineering	S	S	
b) Design experiment, analyze data	S	S	
c) Design system, component, or process	S	S	
d) Function on multidisciplinary team	S		S
e) Solve engineering problem	S	S	S
f) Understand professional & ethical responsibility	S	S	S
g) Ability to communicate effectively	S	S	S
h) Understand impact of engineering solutions	S		S
i) Recognized need for lifelong learning	S	S	S
j) Knowledge of contemporary issue	S		S
k) Ability to us engineering techniques, skill, and tools	S	S	

As shown in Table 3.3, the Student outcomes are mapped to the Program Education Objectives. The Program Educational Objectives are addressed throughout the courses making up the curriculum and through extracurricular and student organizations' activities.

To achieve the first Educational Objective (which is the main objective of the program) the graduates must have attained to a satisfactory extent (and in a balanced way) the abilities described by the majority of student outcomes. This objective also reflects the

emphasis that the program places on a strong fundamental of electrical engineering and on the analytical and design skills.

The second Educational Objective reflects the emphasis that the program places on adequately preparing the students for graduate or professional studies and also on inspiring the students to pursue such studies and also to become a more productive member of society.

The third Educational Objective reflects the emphasis that the program places on the most effective utilization of the general education component which consists of several courses in management, environmental studies, and ethics. The globalization of the economy, the strong international enrollment and the need of our graduates to successfully compete in the international job market makes this objective important.

Table 3.4 PEO Attainment Indicators

Program Educational Objectives	PEO Attainment Indicators
1. Our graduates will have successful careers in his/her profession, especially in the field of electrical power engineering	• Emplyoment in state owned, local private companies, or global private companies • Entering professional career as Electrical Power Engineer
2. Our graduates will be able to pursue higher education or continuing professional development	• Enrollment in graduate or continued education • Work Assignments That Allow Continued Learning
3. Our graduates have active leadership and become pioneer for serving his/her community	• Having good leadership • Leading either small or big team

CRITERION 4. CONTINUOUS IMPROVEMENT

C. Student Outcomes

Students Outcomes (SO) are measured using course rubrics for the direct measurement and student exit survey for the indirect measurement. The assesmen and evaluation for student outcomes are summarized in Table 4.1. Meanwhile, the student exit survey is run each year. Although it is not directly related the student outcomes, on-line course survey are performed for course improvement to better achieve some student outcomes in which the course survey is run at the end of each semester through ITB SI-X system.

The organizational structure in program level for the decision making processes for curricular issues, at the program level, is shown in the block diagram in Figure 4.1. All inputs go to EPE Curriculum Committee first and they are brought to EPE Program Commitees Meeting directly or in some cases also through a meeting with Course coordinators. EPE Program communicates on some decisions of the meeting with Research Groups, where faculties belong to. In some cases EPE program curriculum committee may also coordinates with the Research Groups. EPE curriculum committee share the reports on continuous improvement result on education process to SEEI Quality Control unit.

Although it is not directly measured the student outcomes, improvement in the operational or implementation level is normally decided in program level through discussion or meeting between EPE program chair, course coordinator, and curriculum committee. Implementation or operational modification means small change in a course syllabus, order of topic in a course, example in course(s), accentuation in courses, additional topics to be added, coordination between courses offered in the same semester. The improvement efforts for courses or their deliveries, in this case, may be based on assesmen using Course Survey that is done every semester excluding the short semester i.e. the 3rd semester preceeding the new academic year.

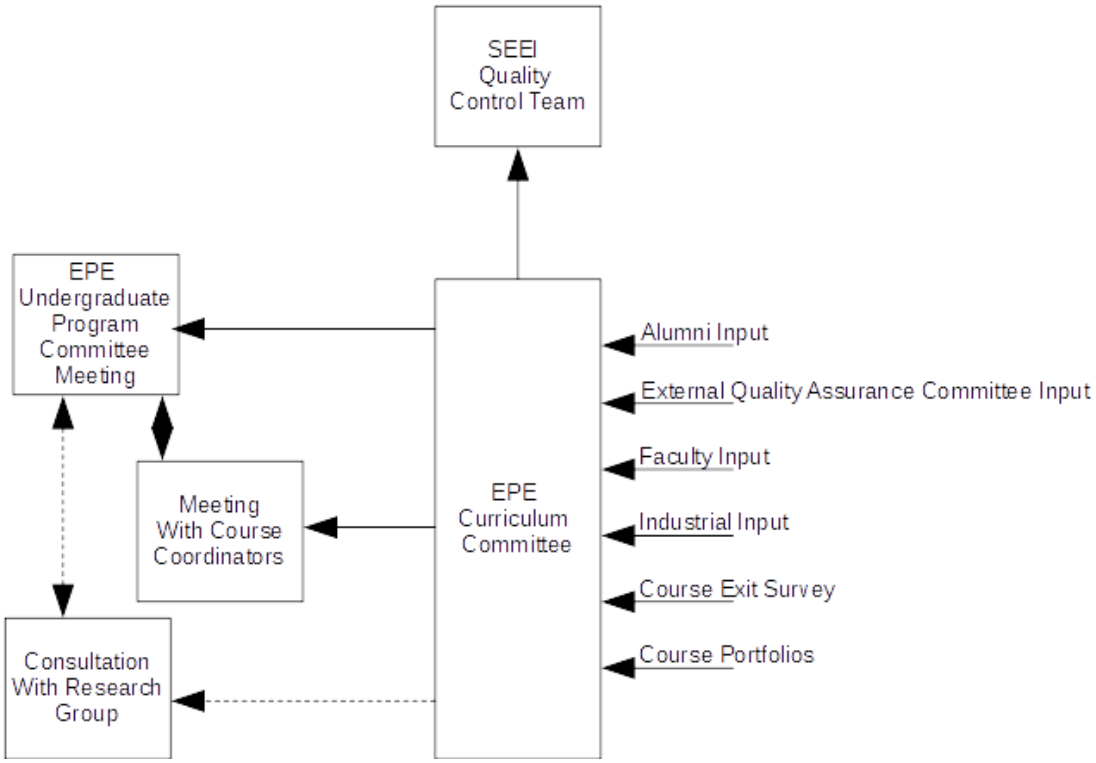


Figure 4.1 Organization Structure

The following sections discuss in detail the process that has been taking place in the program.

STUDENT OUTCOME MEASUREMENT USING RUBRIC

The measurement of outcomes is done mainly through rubrics evaluation from selected courses as depicted in Table 4.2. We have made a number of alternative efforts to make sure adequate data obtained regularly for outcomes assesment. As a usual start, a faculty member who taught the above courses was asked to make a rubric for each contributing outcome and the measurement were done each semester and spread over the years. For every outcome, we define several performance indicators. For every performance indicator, a problem and rubric to is created. The rubric divides the attainment level of the student into four categories:

- **Unsatisfactory**. This category is for the student work that we consider the outcome is not achieved. We give weight '1' for this category.
- **Marginal**. This category is for the student work that we consider the outcome is achieved in the minimum level. We give weight '2' for this category.
- **Proficient**. This category reflects the average level of attainment of certain outcome from the student work. We give weight '3' for this category.
- **Exceptional**. This category is for the student work that is very good. We give weight '4' for this category.

Using this rubric and reasoning, we expect most of student result is established between marginal and proficient categories. We set the value 2.5 out of a maximum score of 4.0 (in the middle between marginal and proficient) as our achievement

threshold. It means that if an outcome fell below 2.5, we would consider that attention or improvement is required for that particular outcome.

The course rubric used for measurement are derived from performance indicator as described in Table 4.1.

Table 4.1. Performance Indicator of Student Outcomes

No.	Student Outcomes	Performance Indicator
a	An ability to apply knowledge of mathematics, science, and engineering	(1) Students fail to show the understanding of basic concept
		(2) Students able to show the understanding of basic concept, but fail to conduct the calculation properly
		(3) Students able to show the understanding of basic concept and conduct the calculation properly
		(4) Students able to show the understanding of basic concept and conduct the calculation properly and correctly
b	An ability to design and conduct experiments, as well as to analyze and interpret data	(1) Students fail to show the understanding of experiment objective
		(2) Students able to show the understanding of experiment objective, but fail to correctly taking data and provide correct analysis on the report
		(3) Students able to show the understanding of experiment objective, correctly taking data, but fail to provide correct analysis on the report
		(4) Students able to show the understanding of experiment objective, correctly taking data, and provide correct analysis on the report
c	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	(1) Students fail to show the understanding of design concept and design constraint
		(2) Students able to show the understanding of design concept, but fail to show the understanding of design constraint
		(3) Students able to show the understanding of design concept and design constraint, but provide unworkable engineering designs
		(4) Students able to show the understanding of design concept, design constraint, and provide workable engineering designs
d	An ability to function on multi-disciplinary teams	(1) Students do not show the interest to work in team
		(2) Students have interest to work in team, but can not communicate the idea effectively as a team
		(3) Students have interest to work in team and able to communicate as a team
		(4) Students have interest to work in team and good interaction as a team

No.	Student Outcomes	Performance Indicator
e	An ability to identify, formulate, and solve engineering problems	(1) Students fail to show the understanding of basic concept
		(2) Students able to show the understanding of basic concept, but fail to provide engineering solutions
		(3) Students able to show the understanding of basic concept but provide unworkable engineering solutions
		(4) Students able to show the understanding of basic concept and provide workable engineering solutions
f	An understanding of professional and ethical responsibility	(1) Students do not understand any professional and ethical attitude
		(2) Students only understand the concept of professional and ethical attitude
		(3) Students understand the concept of professional and ethical attitude, but show professional and ethical attitude improperly
		(4) Students understand and show professional and ethical attitude properly
g	An ability to communicate effectively	(1) Students fail to describe the general idea
		(2) Students do not describe the general idea systematically
		(3) Students describe the general idea systematically, but fail to impress the peer
		(4) Students describe the general idea systematically and impress the peer
h	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	(1) Students fail to show understanding of engineering context to global, economic, environmental, and societal context
		(2) Students show understanding of engineering context to global, economic, environmental, and societal context partially
		(3) Students show understanding of engineering context to global, economic, environmental, and societal context globally
		(4) Students show deep understanding of engineering context to global, economic, environmental, and societal context

No.	Student Outcomes	Performance Indicator
i	A recognition of the need for, and an ability to engage in life-long learning	(1) Students do not have interest in life-long learning
		(2) Students have interest , but do not have engagement in new knowledges
		(3) Students have interest and have curiosity to pursue new knowledges
		(4) Students actively and passionately pursue new knowledges
j	A knowledge of contemporary issues	(1) Students do not have interest in contemporary issues
		(2) Students have interest , but do not have engagement in contemporary issues
		(3) Students have interest and have curiosity to learn contemporary issues
		(4) Students actively and passionately learn contemporary issues
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	(1) Students do not understand and can not use the techniques, skills, and modern engineering tools necessary for engineering practice
		(2) Students can use the techniques, skills, and modern engineering tools necessary for engineering practice, but do not understand the principal
		(3) Students can use the techniques, skills, and modern engineering tools necessary for engineering practice, but only for particular needs
		(4) Students can use the techniques, skills, and modern engineering tools necessary for engineering practice comprehensively

Table 4.2 Student Outcomes Assesment

Student Outcome (SO)	Contributing Courses	Assesment Methods	1st Cycle : Courses for Data Collection	Length of Assesment Cycle	Year of Data Collection	Performance Target
a	EP 3072	Rubric	EP 3072	2 years	2015/2016 2016/2017	2,5
b	EP 3172	Rubric	EP 3172	2 years	2015/2016 2016/2017	2,5
c	EP3070	Rubric	EP3070	2 years	2015/2016 2016/2017	2,5
d	EL2142	Rubric	EL2142	2 years	2015/2016 2016/2017	2,5
e	EP3075	Rubric	EP3075	2 years	2015/2016 2016/2017	2,5
f	EP3171, EP3172	Rubric	EP3171, EP3172	1 years	2016/2017	2,5
g	EP 4099	Rubric	EP 4099	2 years	2015/2016 2016/2017	2,5
h	EP 3070	Rubric	EP 3070	2 years	2015/2016 2016/2017	2,5
i	EP4073	Rubric	EP4073	2 years	2015/2016 2016/2017	2,5
j	EP4099	Rubric	EP4099	2 years	2015/2016 2016/2017	2,5
k	EP3171	Rubric	EP3171	2 years	2015/2016 2016/2017	2,5

Table 4.3 Course Selected for Rubrics

Course		Outcomes										
		A	B	C	D	E	F	G	H	I	J	K
EL2142	Digital and Microprocessor Systems	S	M		M	M						
EP3070	Electric Power Plants	S		S		M			M			M
EP3072	Power Electronics	S				S						M
EP3075	Power System Analysis	S				S						M
EP3171	Electrical Power Laboratory I		S				S					S
EP3172	Electrical Power Laboratory II		S				S					S
EP4073	Selected Topics in Electrical Power	M							M	M	S	
EP4099	Final Project II	S		M	M	S	M	S		M	M	M

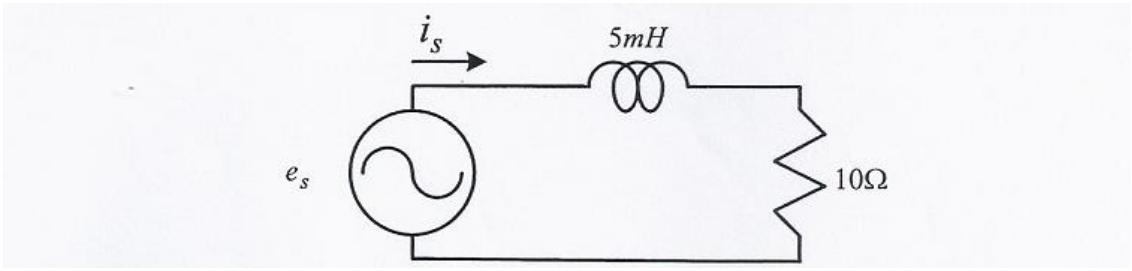
Note: S for Strong relation; M for Medium relation, L for Low relation

The performance indicator (1) was used for outcome (a) measurement on EP3072 Power Electronics course. The measurement was performed during a quiz held on 12 April 2016. The rubric and result are presented in Figure 4.2.

Student Outcomes (a): An ability to apply knowledge of mathematics, science, and engineering

Test 1 - EP3071 Power Electronics
April 12, 2016

1. A One-phase voltage supply provide a linear load as shown in the picture bellow. The supply is represented by
   $e_s = 220\sqrt{2}\,cos(100\pi t) + 25\sqrt{2}\,sin(300\pi t)\ volt$
   Determine :
   a. Effective current of the supply
   b. Power factor



Exceptional (Score 4) :
- Students correctly answer both effective current and power factor

Proficient (Score 3):

- Students only answer effective current correctly

Marginal (Score 2):

- Student show understanding of effective value concept but fail to show the correct answer

Unsatisfactory (Score 1):

- Student do not show any understanding on effective value concept

Student Outcomes (i): A recognition of the need for, and an ability to engage in life-long learning	Exceptional	Proficient	Marginal	Unsatisfactory
Self-assesment report: State your career goals and your plan to achieve it	29	9	0	18

Sample: 56 of 56 students

Score : ((29*4)+(9*3)+(0*2)+(18*1))/56 = 2.875

Figure 4.2 Rubric Measurement Sheet (example)

The documentation of outcome measurements is managed by the EPE undergraduate committee. Although most of materials for measurements, such as student works or presentations, are kept by the faculty, sample of such documents are kept in course portfolios by EPE program.

In doing a direct measurement using rubric, the faculty responsible for each of the course and some of them were being partnered with a member of the ABET accreditation team to help them understand and did the activities that they were asked to. This procedure was a part of the effort so faculty member aware of the extra load they need to take for conducting this effort.

Although this effort of measurement of outcome using rubric was not the first time we directly measured the program outcome, we still encountered some non-technical difficulties. To ease the faculty burden, for example, the curriculum committee also initiated to propose draft of the rubrics to revise by the faculty.

Even if the mindset of many faculty members was inline with the concept of outcomes direct measurement, the effort was still considered unnecessarily putting more faculty work load. Consequently, not many courses provided results each semester and the activity was often re-planned.

In another effort, the EPE program built an excursion program to develop further knowledge and to complement the learning process in class with real life experience. The

excursion program is organized by a body of student advised by teaching lecturer to make sure the program is inline with the curriculum taught.

Table 4.4. Student Outcomes Measurement Data (EPE courses)

SO	Course/Score	Sem 1 15/16	Sem 2 15/16	Sem 1 16/17	Sem 2 16/17
a	Course		EP 3072		EP 3072
	Score		2,875		3,08
b	Course		EP 3172		EP 3172
	Score		3,630		3,333
c	Course		EP3070		EP3070
	Score		3,021		3,932
d	Course	EL2142		EL2142	
	Score	3,885		3,861	
e	Course	EP3075		EP3075	
	Score	3,375		3,370	
f	Course			EP3171	EP3172
	Score			3,826	3,711
g	Course	EP 4099		EP 4099	
	Score	3,490		3,733	
h	Course		EP 3070		EP 3070
	Score		2,875		1,773
i	Course	EP4073		EP4073	
	Score	3,16		2,920	
j	Course	EP4099		EP4099	
	Score	2,6		2,960	
k	Course	EP3171		EP3171	
	Score	3,75		3,543	

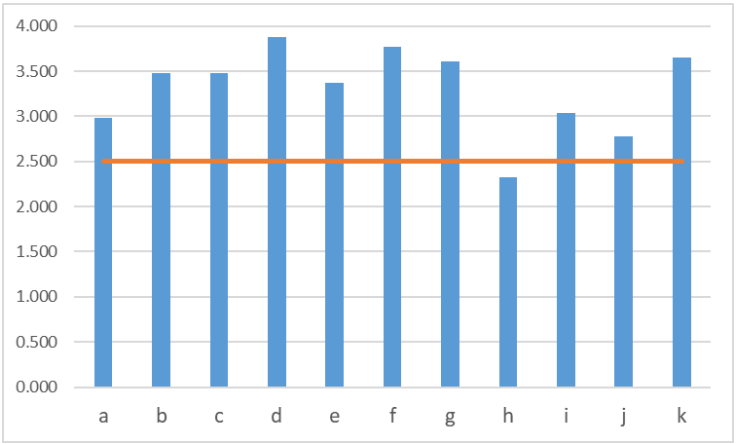


Figure 4.2 Average Student Outcomes to threshold

Table 4.3. presents the result of the program outcome measurement at EPE courses spread over the semesters and years in which the 1st cycle of assessment started from Semester-1 2015/2016. Apart from SO measurements at EPE offered courses, some freshmen courses at ITB Common Preparatory Level were also measured by different team and the result is depicted in Table 4.4. as complement data. It shows that the results are essentially above the EPE program attainment threshold of 2.5. It should be noted that the ITB Common Preparatory Level students are not of the EPE Program since they have not yet been considered as the students of any undergraduate program in SEEI.

Table 4.5. SO Measurement Result (Courses at ITB Common Preparatory Level)

SO	Sem1 14/15	Sem1 15/16	Sem2 15/16	Freshmen Courses	Average
a		2.67	2.33	MA1101,FI1201	2.50
b			2.92	FI1201	2.92
d		2.93		KU1010	2.93
f		3.43	3.35	KU1010,KU1072,KU2061,KU207	3.39
g		2.04	2.87	KU1021,KU1101	2.46
h			2.81	KU1201	2.81
j			3.17	KU2061,KU2071	3.17
k	3.19	3.33		KU1072(2)	3.26

Table 4.6 Average Attainment Level of Student Outcomes

SO	Sem 1 15/16	Sem 2 15/16	Sem 1 16/17	Sem 2 16/17	Diff	Action (P/I/M)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
a		2,875		3,08	0,205	M
b		3,630		3,333	-0,297	M+
c		3,021		3,932	0,911	M
d	3,885		3,861		-0,024	M
e	3,375		3,370		-0,005	M
f			3,826	3,711	-0,115	M
g	3,490		3,733		0,244	M
h		2,875		1,773	-1,102	P
i	3,16		2,920		-0,240	I+
j	2,6		2,960		0,360	I
k	3,75		3,543		-0,207	M+

The summary result of outcome measurements is presented in Table 4.6 above. The first column represents the outcomes. The second and third column represents the measured

outcome attainment in the first half. The fourth and fifth columns represents the measured outcome attainment in the second half. The sixth represent level of urgency and importance to take action to the corresponding outcome. Mark 'I' means the outcome needs to be improved, 'M' means the achievement of the outcome needs to be maintained, and 'P' means that it is a priority to bring significant measure to the outcome. Mark 'M+' means that particular attention is needed to maintain the outcomes. Mark 'I+' means that more consideration is needed to be improved.

Firstly, general evaluation first assessment cylces is presented and the details are presented in th next section. By taking a margin of 0.20, in comparison to the first half measurement, general evaluation of the outcome measurement up to first cycle measurement shows the following results (see the 6th column of Table 4.6).

- There are no significant changes (M) on outcomes (a), (c), (d), (e), (f), and (g).
- Considerable decrease but still above 3.00 (M+) are shown by outcomes (b) and (k).
- Considerable decrease but still below 3.00 and above threshold 2.50 (I+) are shown by outcomes (i)
- Considerable improvements but still below 3.00 and above threshold 2.50 (I) are observed on (j).
- The outcomes below threshold (2.50) are shown by outcomes (h).

The first cycle outcome measurements shows results that is aligned in general with the course exit surveys. There is survey to confirm the outcome measurements and to help make decision in the EPE program, i.e. course exit survey. These surveys are described below.

SO	Measurement Result				Exit Survey Result			
	Sem 1 15/16	Sem 2 15/16	Sem 1 16/17	Sem 2 16/17	Sem 1 15/16	Sem 2 15/16	Sem 1 16/17	Sem 2 16/17
a		2,875		3,08		3,56		3,46
b		3,630		3,333		3,600		3,444
c		3,021		3,932		3,390		3,46
d	3,885		3,861		3,430		3,000	
e	3,375		3,370		3,260		3,385	
f			3,826	3,711			3,53	3,33
g	3,490		3,733		4,000		3,730	
h		2,875		1,773		3,43		3,5
i	3,16		2,920		3		3,270	
j	2,6		2,960		4		3,200	
k	3,75		3,543		3,52		3,44	

The results from the course exit survey show a different concern as perceived by the students. The results indicate that the students reach the outcomes for each course surveyed. Most of the measured outcomes are inline with the course exit survey.

D. Continuous Improvement

This subsection presents the continuous inprovement that has been and will be implemented in EPE program. The continuous improvement is performed at any time regarding the fine tuning of curriculum in the form of syllabus adjustment every semester. The improvements that will be explained in this subsection are the major improvement regarding curriculum based on outcome measurement.

B.1 CONTINUOUS IMPROVEMENT 2016-....

This improvement is based on the measurement in 2015 and 2016 academic year.

Evaluation/Analysis - Our main issue for the measurement conducted in 2015 and 2016 academic year is outcome (h) (impact of engineering solutions) whose attainment level based on the result is below threshold (2.50). The next priorities which need attention are: outcome (i) (life-long learning), outcome (j) (contempory issues), outcome (b) (An ability to design and conduct experiments, as well as to analyze and interpret data), and (k) (An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice).

Based on our faculty discussion, these shortcomings are due to lack of interest to gain broader knowledge outside of core electrical power engineering. Most of students also lack experience in practical engineering activities which is reflected in outcomes (b) and (k). Most of them do not have sufficient chances to use their knowledge to do practical engineering project.

Then from various input and assessment, we can conclude firmly that we need a part of curriculum that:

(1) give the student chance to broaden their exposure to non-electrical power engineering materials
(2) put/use together all necessary knowledge and skills to solve problem/project;

Action – According to these reasons, some actions need to be planned by EPE Program. To improve lack of broad knowledge on non-EPE, we think that we should give more access about knowledge non-EPE by inviting the visiting scholar or professional to talk to the student about non-EPE materials. The implementation of this action has been started by informing the course instructor of EP4073 Selective Topics in Power Engineering to invite more visiting or professional scholar to give a talk for non EPE field for the upcoming course opening in 2017.

We address to second problem by providing students more practical based problems to develop engineering solving capability. First action is to make our laboratory course to

become more interesting by introduce more up-to-date laboratory equipment. For this action, we have conducted several activities:

(1) We have proposed some lab improvements funding to JICA (Japan International Corporation Agency) through ITB.

(2) We have secured funding of USD 35.250 from alumni donations that is used to retrofit some high voltage laboratory experiments apparatus, in the end of 2016, such as :

   a. Retrofit 4 (four) high voltage transformer test equipments

   b. Retrofit high voltage test equipments: high voltage capacitor and resistor, high voltage ball-gap measurement, high voltage electrodes (ball, needle, plate), high voltage grounding mechanism, high voltage triggering system

(3) We have secured funding of USD 30.000 from alumni donations that is used to develop some new laboratory experiment modules in 2017, such as:

   a. Measurement System laboratory work course:

      i. Metering and sensor module

      ii. Earth resistancy & resistivity measurement module

      iii. Current Transformer & Potential Transformer calibration module

      iv. Cable fault location module

   b. High Voltage Engineering laboratory work course:

      i. Partial Discharge measurement module

   c. Power System Protection laboratory work course:

      i. Overcurrent relay coordination module

      ii. Electromagnetic transient analysis module

Second action is to encourage the faculty members to provide more practical based problems during the course. We have started this action by informing all of the course instructor during program meeting to update the next upcoming course. Last action is to encourage the student to have more participation in engineering contest at any level.

Recapitulation - The student outcome of second measurement of first cycle:

1. Outcome (a) : An ability to apply knowledge of mathematics, science, and engineering
   - Measurement result: 3.08

- Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is.
- Action: No significant action is required for this outcome. However, course instructor is encourage to provide more problem in some particular courses to strenghten student capability. We have started this action by informing all of the course instructor during program meeting to update the next upcoming course.

2. Outcome (b) : An ability to design and conduct experiments, as well as to analyze and interpret data
   - Measurement result: 3.33
   - Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is but need particular consideration.
   - Action: A new grading scheme was aplied during measurement. The new grading scheme is separating each scoring component and applying penalty system. Therefore, the students should be informed clearly about the new grading scheme prior the course. Program Chair has informed the course instructor for Electrical Power Laboratory 1 and 2 regarding this new scoring method. Course Instructor for Power Laboratory 2 has proposed the new scoring method.
3. Outcome (c) : An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
   - Measurement result: 3.93
   - Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is.
   - Action: No significant action is required for this outcome.
4. Outcome (d) : An ability to function on multi-disciplinary teams
   - Measurement result: 3.86
   - Analysis: : the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is.
   - Action: No significant action is required for this outcome.
5. Outcome (e) : An ability to identify, formulate, and solve engineering problems
   - Measurement result: 3.37
   - Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is.
   - Action: No significant action is required for this outcome. However, course instructor is encourage to provide more problem in some particular courses to strenghten student capability. We have started this action by informing all of the course instructor during program meeting to update the next upcoming course.

6. Outcome (f) : An understanding of professional and ethical responsibility
   - Measurement result: 3.71
   - Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is but need particular consideration.
   - Action: A new grading scheme was aplied during measurement. The new grading scheme is separating each scoring component and applying penalty system. Therefore, the students should be informed clearly about the new grading scheme prior the course. The new proposed scoring method as in outcome (b) is used to asses this outcome
7. Outcome (g) : an ability to communicate effectively
   - Measurement result: 3.73
   - Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is but need particular consideration.
   - Action: No significant action is required for this outcome.
8. Outcome (h) : The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
   - Measurement result: 1.77
   - Analysis: the attainment level is below the 2.50 threshold and considered inadequate. Therefore, it requires serious attention for improvement. The significant project in which an engineering problem to be analysed in broader view is needed.
   - Action: This measurement will be reevaluated due to suspicision of violation academic norm. The reevaluation will be conducted in the next cycle by putting more academic norm awareness. We have started this action by informing the course instructor during program meeting to re-evaluate in the next upcoming course by putting more academic norm awareness to the student.
9. Outcome (i) : A recognition of the need for, and an ability to engage in life-long learning
   - Measurement result: 2.92
   - Analysis: the attainment level is above the 2.50 threshold and considered adequate. However, the measurement is below 3.00. Hence, there is action needed to improve the measurement.
   - Action: To add more proportion to the guest lecture from academia without reduce the proportion from professional/industry. The implementation of this action has been started by informing the course instructor of EP4073 Selective Topics in Power Engineering to invite more visiting or professional scholar to give a talk for non EPE field for the upcoming course opening in 2017.
10. Outcome (j) : A knowledge of contemporary issues
    - Measurement result: 2.96
    - Analysis: the attainment level is above the 2.50 threshold and considered adequate. However, the measurement is below 3.00. Hence, there is action needed to improve the measurement.

- Action: Final Project committee will be assembled by the program and will receive the suggestion from Faculty Members regarding Final Project topics. Final Project committee chair has been decided by Program Chair. Final Project chair will set up some new scoring draft which reflect the outcomes of Final Project, especially in the design process. This new scoring draft is expected to be used in the upcoming Final Project II course.

11. Outcome (k) : An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
    - Measurement result: 3.54
    - Analysis: the attainment level is above the 2.50 threshold and considered adequate. Hence, the appropriate action for this outcome is to maintain attainment level as it is.
    - Action: Extra class will be held prior the experiment course to help students reach the sufficient level of experiment course.

CRITERION 5. CURRICULUM

A. Program Curriculum

In general, EPE delivers its courses on the semester system. There is only one curricular path; however students are allowed to enroll in elective courses, which are primarily taken during the senior year of study. The combination of mandatory and elective courses is expected to produce graduates that capable to function in broad area of professional works. In general several areas that potentially our graduates become are to be (1) System Engineers; (2) Design Engineers; (3) Production Engineer; (4) Operation and Maintenance; (5) Management.

From these categories we can derive a set of specific skills necessary to be acquired by our graduates. The skills required to develop these professions are (1) Analysis; (2) Synthesis; (3) Integration; (4) Implementation; (5) Operation. The relationship between skills needed for a particular profession is listed in the Table 5.1.

Table 5.1: Skill to Profession Relationship

	Analysis	Synthesis	Integration	Implementation	Operation
System Engineer	XXX	XXX	XXX	X	X
Design Engineer	XXX	XXX	XX	X	X
Production Engineer	XX	XX	XXX	XXX	XX
Operation & Maintenance	XX	XX	XXX	XX	XXX
Management	X	X	X	X	X

Note: X marks is a relative weight given to indicate the correlation. (X weakly correlated; XX correlated; XXX strong correlated)

The Electrical Power Engineering Program curriculum is designed to meet the program educational objectives and the skills required by the profession. The primary means of achieving the educational goals is the curriculum. EPE curriculum is targeted to fulfill the skills requirement and it covers the following aspects of the curriculum, i.e. General Education, Mathematics and Basic Science, Engineering Science and Engineering Design appropriate to Electrical Power Engineering. Table 5.2 shows mapping of required skills to the curriculum.

Table 5.2: Mapping Skills to Curriculum

	Mathematics & Basic Science	Engineering Science	Engineering Design	General Education
Operation & Maintenance	X	X	XX	X
Implementation	X	X	XXX	X
Integration	X	X	XXX	X
Synthesis	X	XX	XXX	X
Analysis	XXX	XXX	XX	X

Note: X marks is a relative weight given to indicate the correlation. (X weakly correlated; XX correlated; XXX strong correlated)

The curriculum derives set of courses that has designated outcomes which addresses the EPE Program Educational Objective, the relation of PEO and Student Outcomes was presented in Table 3.3. The EPE program curriculum is also designed to satisfy the EAC/ABET requirements and also the curricular requirement of ITB.

ITB requires that all educational programs must enroll to ITB Common Preparatory Level for the freshmen year. ITB Common Preparatory Level consists of mathematics and basic science, a set of general education courses along with a requirement of management and environment courses, and at least 3 hours of free electives outside the EPE program. The EPE program curriculum consists of six elements and with a total of 144 credit hours. The non EPE elective course of 3 credit hours may fall in any category such as general education, maths & basic science, or engineering topics offered by non EPE program in the university.

The following subsection presents the description of each section of the curriculum structure and its contributions to the student outcomes.

GENERAL EDUCATION

The general education and 3 credit hours of a Non EPE Elective is listed in Table 5.3 below. The general education consists of 10 courses (total 21 credit hours). The general education part satisfy all the requirements of the ITB general education curriculum. The Non EPE Elective course may be taken from any other undergraduate programs of ITB, including Community Service and Studium Generale courses.

Table 5.3: General Education Components

Code	General	Credit	Course	Lab	Other	Contributing Student Outcomes

	Education		(%)	(%)	(%)	a	b	c	d	e	f	g	h	i	j	k
KU1011	Indonesian Language: Scientific Writing	2	100						S			S				
KU1101	Introduction to Engineering and Design I	2	100			M		M		M	M					
KU102X	English	2	100							M		S				
KU1001	Sports	2	100						S							
KU1201	Introduction to Engineering and Design II	2	100			M		M		M	M					
KU206X	Religion and Ethics	2	100					M			M					
KU2071	Pancasila and Civic Education	2	100								M		M			
	Enviromental Sci. Elective	2	100													
	Management Elective	2	100													
	Non EPE Elective	3	100													

Annotation:
S represents a strong contribution of the course to the outcome
M represents a medium contribution
L represents a low contribution

The General Education Component includes four credit hours of English composition and technical writing. The other courses contributes to the accomplishment of Program Educational Objectives, regarding the broad education necessary to understand the impact of engineering solutions in a global and societal context. The curriculum is also provide several courses to be selected as Environmental Science electives. While, Management electives and Non EPE elective to ensure that all our students take those General Education courses that best complement the technical content of the curriculum. KU206X Religion and Ethics and KU2071 Pancasila and Civic Education are, required by national regulation for higher degree education. Table 5.4 shows courses that is offered as electives for General Education Components.

Table 5.4: List of courses offered for General Education Components electives

Code	Course Name	Chr
IL2205	Environmental Health	2
MB4045	Investment Management	3
MB4055	Project Management	3
MR2101	Introduction to Engineering Management	2
MR3002	Management Technology	3
MR4004	Engineering Management	2
TI3005	Organization and Management of Industrial Companies	2
TI4004	Industrial Management B	2

TI4204	Human Resource Management	3
TL2105	Environmental Health	3
TL4002	Environmental Engineering	3
TL4201	Environmental Impact Assessment	3
BI2001	General Environmental Science	2

The background and skills acquired through the General Education Component, along with the technical skills and the design tools acquired through the Engineering Component of the curriculum, are integrated in the Final Project courses sequence which provides the students with the major design experience that culminates the program.

MATHEMATICS AND BASIC SCIENCE

The mathematics and basic science component of total 35 (thirty-five) credit hours consists of 15 (fifteen) credit hours of Basic Sciences and in 20 (twenty) credit hours of Mathematics as shown in the Table 5.6 below.

Table 5.5 Mathematics and Basic Science Components

Code	Basic Science	Credit	Course (%)	Lab (%)	Other (%)	Contributing Student Outcomes										
						a	b	c	d	e	f	g	h	i	j	k
MA1101	Mathematics IA	4	100			S				M						
FI1101	Elementary Physics IA	4	75	25		S	M			M						
KI1102	General Chemisty IB	2	100			S										
MA1201	Mathematics IIA	4	100			S				M						
FI1201	Elementary Physics IIA	4	75	25		S	M			M						
KI1202	General Chemisty IIB	2	100			S										
MA2072	Engineering Mathematics I	3	100			S				S						
MA2074	Engineering Mathematics II	3	100			S				S						
EP2091	Probability and Statistics	3	100			S				M						
MS2041	Thermal Engineering and Fluid Mechanics	3	100			S				M						
EP3073	Numerical Analysis for Electrical Power	3	100			S				S						S

Annotation:

S represents a strong contribution of the course to the particular outcome
M represents a medium contribution
L represents a low contribution

Most of the courses listed in Table 5.5 are part of the freshmen ITB Common Preparatory Level, including Mathematics, Physics, and General Chemistry. After the student is admitted into undergraduate program, they will get courses in Engineering Mathematic, Thermal Engineering and Fluid Mechanics, and Probability and Statistics during the sophomore year. The last Mathematics and Basic Science components are provided in

third year on Numerical Analysis for Electrical Power, this course is put on the third year to align with the electrical power engineering topics which most given in the third and fourth year.

The strong background in Mathematics and Physics (provided by the appropriate combination of required courses) is necessary to prepare the students to acquire the ability for life-long learning and the ability to successfully pursue graduate studies, which are two of the student outcomes of the program.

ENGINEERING TOPICS

a. Electrical Power Engineering Core

EPE core courses is the center of EPE curriculum. This components serve as introductory course to electrical engineering, especially power engineering. This provides necessary basic for life-long learning and the ability to find employment in all sectors of Electrical Power Engineering areas.

Table 5.6 shows the EPE core that consists of fourteen required courses with total of 36 (thirty six) credit hours. This courses offer fundamental introductory knowledge and solid background in all electrical engineering area, especially power engineering areas. The core courses are designed to sharpen the engineering ability of EPE students by providing fundamental courses of engineering such as electric circuits and electromagnetics. The students, after successfully completing these courses should have the ability to broaden their knowledge by taking Breadth courses and then have the ability to either focus on one or more areas, or to select their Depth courses from different areas according to their plans or interests.

Table 5.6 Electrical Power Engineering Core Courses

Code	EPE Core	Credit	Course (%)	Lab (%)	Other (%)	Contributing Student Outcomes										
						a	b	c	d	e	f	g	h	i	j	k
KU1072	Introduction to Information Technology B	2	75	25		M				M						
EL1200	Introduction to Circuit Analysis	2	100			S				M						
IF1210	Programming Fundamentals	2	50	25	25	S				M						
EL2001	Electric Circuits	4	100			S				M						M
EL2101	Electric Circuits Laboratory	1		100			S									
EL2142	Digital & Microprocessor Systems	4	75	25		S	M	M		M						
EP2076	Measurements System	3	50	25	25	S	M	S	M							
EL2006	Electromagnetics	3	100			S				S						
EP2094	Signal and Systems	3	100			S				M						S
EL2005	Electronics	3	100			S										
EL2205	Electronics Laboratory	1		100			S									
EL3015	Control Systems	3	75	25		S				M						
EP3095	Electrical Engineering Materials	3	100			S				M					M	

TI3004	Engineering Economics	2	100					S		M			M			

Annotation:

S represents a strong contribution of the course to the particular outcome
M represents a medium contribution
L represents a low contribution

b.Electrical Power Engineering Breadth

The EPE program acknowledges that the EPE field is a broad area of knowledge. The EPE program requires students to take all 8 (eight) courses with total of 21 (twenty one) credit hours. The breadth courses prepare the student for a broad knowledge in the field of electrical power engineering. Table 5.7 presents the list of the EPE Breadth courses.

Table 5.7 Electrical Power Engineering Breadth Courses

Code	Breadth Courses	Credit	Course (%)	Lab (%)	Other (%)	Contributing Student Outcomes										
						a	b	c	d	e	f	g	h	i	j	k
EP3075	Power System Analysis	3	100			S				S						M
EP3071	Electric Machine	3	100			S				S						M
EP3072	Power Electronics	3	100			S				S						M
EP3074	High Voltage Engineering	3	100			S		M		S	M					
ET3003	Elective Telecommunication	2	100			S		M								M
EP3171	Electrical Power Laboratory I	2		100			S				S					S
EP3172	Electrical Power Laboratory II	2		100			S				S					S
EP3070	Electric Power Plant	3	50	50		S		S		M			M			M

Annotation:

S represents a strong contribution of the course to the particular outcome
M represents a medium contribution
L represents a low contribution

c. Electrical Power Engineering Depth

The Electrical Power Engineering Depth component comprises of 31 (thirty-one) credit hours that student have to take, 18 (eighteen) credit hours are mandatory, while the rest are obtained from electives. The electives are open to the students depend on their interest in power engineering areas. The depth courses also serve to equip students with depth knowledge necessary for graduate study. Table 5.8 shows the power engineering depth courses.

Table 5.8 List of Electrical Power Engineering Depth Courses

Code	Depth Courses	Credit	Course (%)	Lab (%)	Other (%)	Contributing Student Outcomes										
						a	b	c	d	e	f	g	h	i	j	k
EP4071	Utilization of Electrical Energy	3	100			S		M	S	S			M			
EP4077	Electrical Power Distribution System	3	100			S		S		S					M	M

EP4073	Selected Topics in Electrical Power	2	100			M							M	M	S	
EP3076	Power System Protection	3	75		25	S		S	M	S				M		
EP4091	Industrial Experience	2			100				M		S	S		M	M	
EP4096	Final Project I and Seminar	2	100			S		S	M	S	M	S		M	M	M
EP4099	Final Project II	4	100			S		S	M	S	M	S		M	M	M
EP4050	Electrical System Project Management	3	100						M			M	S			
EP4072	Energy Management and SCADA	3	75		25	S			M	S					M	
EP4074	System Engineering	3	100			S		M	M	S	M					
EP4075	Electric Motor Applications	3	100			S				S					M	M
EP4079	Relay Protection	3	100			S		S		S						M
EP4090	Engineering Ethics	3	100								S		S		M	
EP4193	Professional and Community Development	3			100						S	S			M	
EP4070	Electrical Power System Design	2	75		25	S		S	M	S						

Annotation:

S represents a strong contribution of the course to the particular outcome
M represents a medium contribution
L represents a low contribution

The EPE curriculum also provides courses for the students to experience practical or industrial project outside campus. EP4091 Industrial Experience course is compulsory with minimum 2 (two) months experience in industrial project involvement, as reflected in 2 credit-hours in Table 5.8.

d. Engineering Design Roadmap

EPE curriculum provides courses with various significance level of design content. EPE courses that include engineering design are considered to have significant design content. The engineering design roadmap is as follows:

1. ITB Common Preparatory Level
   KU1101 Introduction to Engineering and Design I
   KU1201 Introduction to Engineering and Design II
2. Sophomore year:
   EL2102 Digital & Microprocessor Systems
   EP2076 Measurement Systems
3. Junior (third) year:
   EP3070 Electric Power Plant
   EP3076 Power System Protection
   EP3074 High Voltage Engineering
4. Senior (fourth) year:
   EP4070 Electrical Power System Design
   EP4071 Utilization of Electrical Energy
   EP4077 Electric Power Distribution Systems

EP4079 Relay Protection (Elective)
EP4099 Final Project II

EP4099 Final Project II provide EPE students with a major engineering design experience in final semester. These course serves as a culmination of major design. Final project topics in EPE Program covers three major fields, which are power systems, high voltage engineering, and electrical energy conversion. Each field has its design road map course throughout four years study, before culminated by Final Project II course.

1. Power system field, design course road map

- ITB Common Preparatory Level
  - KU1101 Introduction to Engineering and Design I
  - KU1201 Introduction to Engineering and Design II
- Sophomore year:
  - EL2102 Digital & Microprocessor Systems
  - EP2076 Measurement Systems
- Junior (third) year:
  - EP3076 Power System Protection
- Senior (fourth) year:
  - EP4070 Electrical Power System Design
  - EP4077 Electric Power Distribution Systems
  - EP4079 Relay Protection (Elective)
  - EP4099 Final Project II

2. High voltage engineering field, design course road map

- ITB common preparatory level
  - KU1101 Introduction to Engineering and Design I
  - KU1201 Introduction to Engineering and Design II
- Sophomore year:
  - EL2102 Digital & Microprocessor Systems
  - EP2076 Measurement Systems
- Junior (third) year:
  - EP3074 High Voltage Engineering
- Senior (fourth) year:
  - EP4070 Electrical Power System Design
  - EP4099 Final Project II

3. Electrical energy conversion, design course road map

- ITB Common Preparatory Level
  - KU1101 Introduction to Engineering and Design I
  - KU1201 Introduction to Engineering and Design II
- Sophomore year:
  - EL2102 Digital & Microprocessor Systems

- EP2076 Measurement Systems
- Junior (third) year:
  - EP3070 Electric Power Plant
- Senior (fourth) year:
  - EP4071 Utilization of Electrical Energy
  - EP4099 Final Project II

Students are mandatory to take all the courses listed in design road map (except, EP4079 Relay Protection which is Elective). Eventually, in the Final Project II students can select the field between three that has been mentioned previously to be his final project topics according to his own interest.

e. Summary of Contributions to Program Objectives and Student Outcomes

Having described in Criterion 3, the curriculum of the EPE program is consistent with the Program Educational Objectives and related student outcomes through courses, laboratory works, and extracurricular activities that is facilitated by ITB through Office of Student Affairs, that are categorized as shown in Table 5.9.

Table 5.9 Curriculum Contributor to Program Educational Objectives

Program Educational Objectives	Curriculum Contributor
Our graduates will have successful careers in his/her profession, especially in the field of electrical power engineering	Math and basic science courses, EPE core courses, Lab components of core courses, EPE breadth and depth/electives, EPE design courses, final project written reports and presentation.
Our graduates will be able to pursue higher education or continuing professional development	Math and basic science courses, EPE core courses, EPE breadth and depth/electives,
Our graduates have active leadership and become pioneer for serving his/her community	General education courses, EPE core, EE breadth and depth/EPE electives, Industrial experiences, final project seminars, student organization activities.

The number of credits hours devoted to each program criteria is summarized in Table 5.10. The detailed contribution of each component to courses of the EPE curriculum is presented in Table 5.11.

Table 5.10 Program Criteria Credit Hours

	Credit Hours	Percentage

Basic Science and Mathematics	35	24%
Electrical Power Engineering Core	36	25%
Electrical Power Engineering Breadth	21	15%
Electrical Power Engineering Depth	31	22%
General Education and Non EPE	21	14%
Total	144	100%

Table 5.11 Curriculum Electrical Power Engineering Program

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	*Subject Area (Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design	General Education	Other		
MA1101 Mathematics IA	R	4				2015 (1) ; 2016 (1)	*213*
FI1101 Elementary Physics IA	R	4				2015 (1) ; 2016 (1)	*86*
KI11 General Chemistry IB	R	2				2015 (1) ; 2016 (1)	*85*
KU1101 Introduction to Engineering and Design I	R			2		2015 (1) ; 2016 (1)	*72*
KU1072 Introduction to Information Technology B	R		2			2015 (1) ; 2016 (1)	*72*
KU102X English	R			2		2015 (1) ; 2016 (1)	*70*
KU1001 Sports	R			2		2015 (1) ; 2016 (1)	*87*
MA1201 Mathematics IIA	R	4				2015 (2)	*211*
FI1201 Elementary Physics IIA	R	4				2015 (2)	*86*

KI1202 General Chemisty IIB	R	2				2015 (2)	*88*
KU1201 Introduction to Engineering and Design II	R			2		2015 (2)	*71*
KU1011 Indonesian Language: Scientific Writing	R			2		2015 (2)	*85*
EL1200 Introduction to Circuit Analysis	R		2			2015 (2)	9, 64
IF1210 Programming Fundamentals	R			2		2015 (2)	62
EL2001 Electric Circuits	R		4			2015 (2) ; 2016 (1)	41, 50
EL2101 Electric Circuits Laboratory	R		1			2015 (1); 2016 (1)	65
EL2142 Digital & Microprocessor Systems	R		4			2015 (2)	72
MS2041 Thermal Engineering and Fluid Mechanics	R	3				2015 (2) ; 2016 (1)	54, 24
EP2091 Probability & Statistics	R	3				2015 (1); 2016 (1)	36
MA2072 Engineering Mathematics I	R	3				2015 (1); 2016 (1)	79
EL2005 Electronics	R		3			2015 (2) ; 2016 (1)	23, 50
EL2205 Electronics Laboratory	R		1			2015 (2)	149
EL2006 Electromagnetics	R		3			2015 (2) ; 2016 (1)	71, 60
EP2094 Signals and Systems	R		3			2015 (2)	58
EP2076 Measurements System	R		3☑			2015 (2)	38
KU2071 Pancasila and Civic Education	R			2		2015 (2)	93, 75
MA2074 Engineering Mathematics II	R	3				2015 (2)	86
EP3071 Electric Machine	R		3			2015 (2)	45
EP3073 Numerical Analysis for Electrical Power	R	3				2015 (1) ; 2016 (1)	51
EP3095 Electrical Engineering Material	R		3			2015 (1) ;	52

						2016 (1)	
EP3075 Power System Analysis	R		3			2015 (1) ; 2016 (1)	46
EP3171 Electrical Power Laboratory I	R		2			2015 (1) ; 2016 (1)	46
TI3004 Engineering Economic	R		2			2015 (2) ; 2016 (1)	55, 48
EL3015 Control Systems	R		3			2015 (2); 2016 (1)	33, 49
EP3070 Electric Power Plants	R		3☑			2015 (2)	44
EP3072 Power Electronics	R		3			2015 (2)	48
EP3074 High Voltage Engineering	R		3			2015 (2); 2016 (1)	46
EP3076 Power System Protection	R		3			2015 (2); 2016 (1)	3, 46
EP3172 Electrical Power Laboratory II	R		2			2015 (2)	44
EP3000 Elective Telecommunication	R		3			2015 (2); 2016 (1)	86
KU206x Religion and Ethics	R			2		2015 (2); 2016 (1)	33, 41
EP4096 Final Project 1 & Seminar	R		2			2015 (2); 2016 (1)	41, 4
EP4071 Utilization of Electrical Energy	R		3			2015 (1); 2016 (1)	48
EP4073 Selected Topics in Electrical Power	R		2			2015 (1); 2016 (1)	48
EP4077 Electrical Power Distribution Systems	R		3			2015 (1) ; 2016 (1)	49
EP 40XX Electrical Power Elective Course	SE		6			2015 (2);	23

						2016 (1)	
Enviromental Elective	SE			2		2015 (2); 2016 (1)	25, 37
EP4091 Industrial Experience	R		2			2015 (2); 2016 (1)	21, 23
EP4099 Final Project II	R		4 ☑			2015 (2); 2016 (1)	10, 44
EP4070 Electrical Power System Design	R		2			2015 (2); 2016 (1)	19, 32
Management Elective Course	SE			2		2015 (2); 2016 (1)	51, 53
Non EPE Elective Course	SE			3		2015 (2); 2016 (1)	175, 188
Non EPE Engineering Elective Course	SE		3			2015 (2); 2016 (1)	29, 31
Add rows as needed to show all courses in the curriculum.							
TOTALS-ABET BASIC-LEVEL REQUIREMENTS		35	86	23			
OVERALL TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM							
PERCENT OF TOTAL		24.3%	59.7%	16%			
Total must satisfy either credit hours or percentage	Minimum Semester Credit Hours	32	48				
	Minimum Percentage	25%	37.5%				

PREREQUISITE FLOW CHART

The Electrical Power Engineering courses prerequisite flow chart can be seen in Figure 5.2 below.

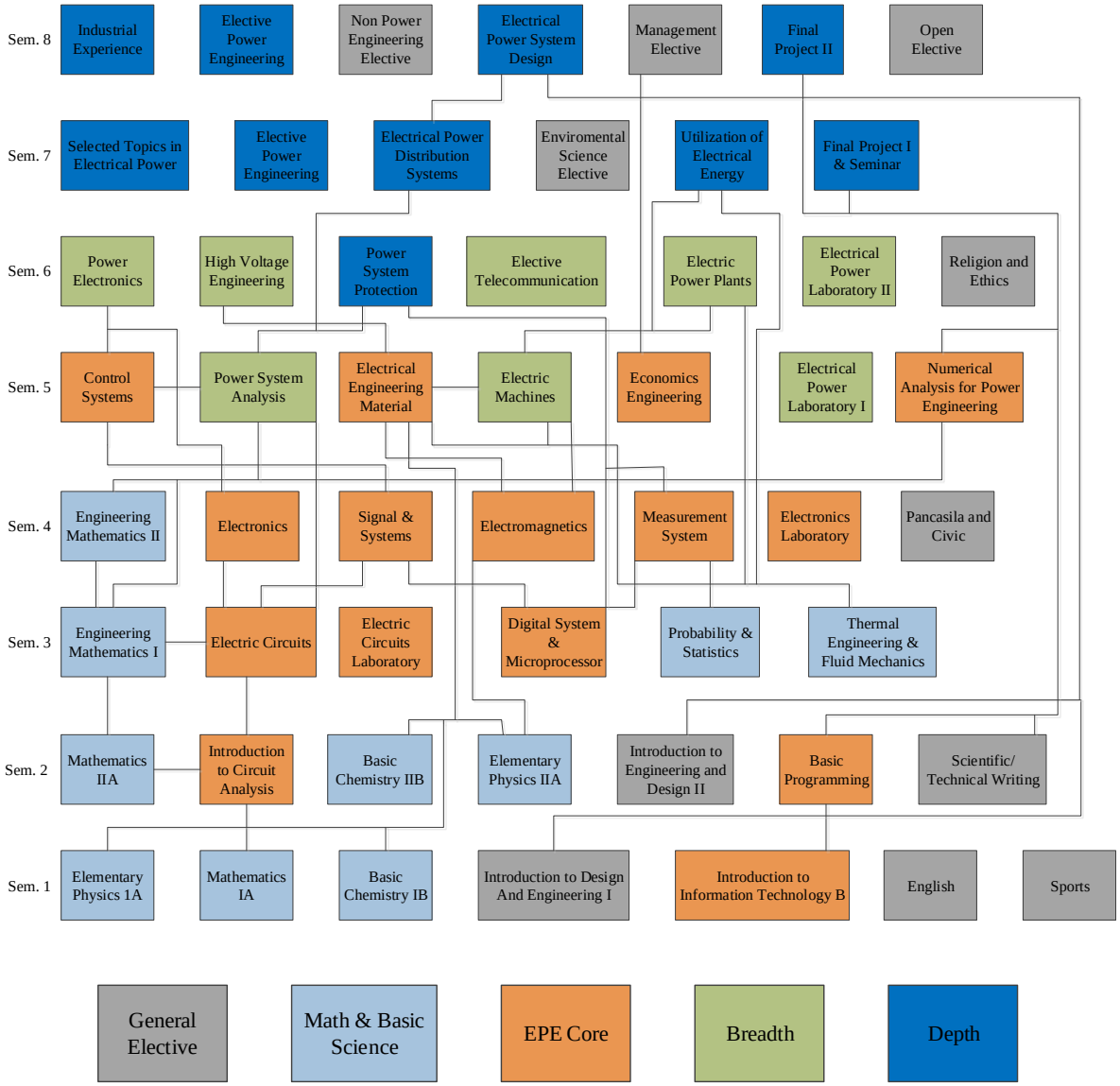


Figure 5.2 Electrical Engineering Prerequisite Flow Chart

B. Course Syllabi

Course Syllabi are attached in Appendix A.

CRITERION 6. FACULTY

There are 33 SEEI faculty members in total with 25 years of teaching and research experiences in average who contribute to EPE program. They are part of 133 faculty members in the School of Electrical Engineering and Informatics. The quantity and qualification of faculty members are adequate for Electrical Power Engineering Program, with the following facts:

- EPE Program delivers around 173 credits hour in total for each year. Therefore for 33 faculty members, the total teaching capacity is still very adequate. In average, the capacity of a faculty member is 5.2 credits each.
- Some courses in EPE program are taught by faculty members form other schools such as engineering math, thermodynamics, civic, and sport.
- Selected faculty members are also assigned as academic advisors with average load of 10 students each (16 faculty members and average of 160 student body). This is considered as adequate, since the method used is online advising, except for special case where face-to-face meeting is required.
- The course instructor comes from different research groups. Their field of competency are various and can fulfill the need of all core and breadth course in EPE program.
- Most faculty members are involved in industrial work and/or research activity to develop their competency and to keep well-informed with current development in their field.

A. Faculty Qualifications

The 33 faculty members of EPE program consist of 5 Professors (Guru Besar), 9 Associate Professors (Lektor Kepala), 15 Assistant Professors (Lektor), 3 Lecturers (Asisten Ahli), and 1 Assistant Lecturer (Instruktur). There are 31 out of 33 members who hold PhD degree (93.94%) while the other two members hold master degree (6.06%). The majority of their Ph.D and Master degree are earned from international education institutions (e.g., from European countries, Australia, Japan, U.S.A) in various areas related to Electrical Power Engineering which brings international cultures and best practices into the program's academic atmospheres. As indicated in Table 6.1, 94% of faculty members contributing to EPE program are tenured.

Among those 33 of faculty members, there are 30 faculty members who have obtained national certification from the Ministry of Research and Higher Education. This certification recognizes their professionalism as an educator in a higher education institution. As previously mentioned, besides the certification for educator, six of our faculty members hold professional engineer certification from the Institute of Engineers Indonesia (Persatuan Insinyur Indonesia / PII). There are three degrees in certification, which are IPU (Senior Professional Engineer), IPM (Intermediate Professional Engineer), IPP (Junior Professional Engineer). One of our faculty members have IPU, and the other five members have IPM.

Competencies of the faculty members are categorized by their Research Group. There are nine Research Groups within the School of Electrical Engineering & Informatics, which are Electrical Power Engineering, Telecommunication Engineering, Biomedical Engineering, Electronics Engineering, Control & Computer System, Computer Engineering, Information Technology, Informatics, and Software Engineering & Data.

The faculty members, according to their scientific activities in each Research Group, are actively upgrading their scientific and technological knowledge and expertise. This fact can be seen from the list of scientific paper produced by the faculty members. According to the schools record, in average, every faculty member is producing 2.97 papers annually.

The faculty members who teach elective courses are involved in activity/research in related field or belong to related laboratory/center.

The School of Electrical Engineering and Informatics encourages all faculty members to attend relevant national and international conferences in their research areas. Funding supports are provided for such activities. Many of them also have years of experience in industry and/or government, which enrich the students in learning experience in the classroom. Involvement in industry is in the form of industrial engineering counseling, engineering project and company/industry creation.

B. Faculty Workload

Ideal teaching load for each faculty member is 6 credit hours per semester if he does other activities (12 credit hours, when he teaches only in one program). Electrical Power Engineering Program delivers around 173 credits hour in total every year. So for 33 faculty members, the total teaching capacity is still very adequate.

Most faculty members who are assigned as academic advisors, where one faculty could handle up to 20 students (at maximum). This is also considered adequate for the average total of student body every year. An academic advisor is responsible to ensure his/her students taking courses that are in the corridor of program's curriculum. Moreover, he/she would make sure that retaking a failed mandatory course is more prioritized than taking higher-level courses. Students can consult their academic issues to their academic advisors any time throughout the semester. In default, the method used is online advising. However, for special cases, face-to-face meeting can be arranged accordingly. Some faculty members are encouraged to advise students with substantial problems such as academic problems, financial problems, and psychological problems. When the faculty member cannot give sufficient advice to the student, they can link the student to LK (Lembaga Kemahasiswaan/ Student Affairs) or BK (Bimbingan Konseling/Student Counseling Services).

Faculty members are also engaged intensely to students in their final year where the students would conduct the final projects. Faculty members are responsible to provide the topics of final project to the students. The students have the right to choose which topics they would work on or which faculty member is suitable for their final projects. The final project is designed to be multi discipline, teamwork, and based on actual problems in electrical power engineering. The faculty member also constantly

supervise his/her students in completing the final project and writing the final report accordingly, as well as guiding for the students' final defense at the end of the second project stage that are attended by at least two faculty examiners.

C. Faculty Size

Size –We believe that the size of the faculty is adequate to deliver the program. Our EPE undergraduate program has an average enrollment of 50 students each regular semester (excluding freshmen who have not enrolled at EPE program and are taught mostly by faculty members from other School/Faculties). With the total number of 33 faculty members, this gives a 1.5:1 of student:faculty ratio, which is an ideal ratio in providing a quality education.

Tables 6.1 and 6.2 describe the composition, size, credentials, experience, and workload of the faculty members who support EPE program, specifically who teach EPE courses in 2015/2016 academic year (August 2015 – July 2016). As ITB is a state owned institution whose most of employees including the faculty members are civil servant, Indonesia government states that faculty member in universities must involve in teaching activity, research activity, and governmental/industrial practice. This concept is also called as Tridharma Perguruan Tinggi (Three Pillars of Higher Education). The institution monitors the balance for each faculty member in each semester, based on faculty member's proposal (FRK/Form Rencana Kerja or Activities Planning Sheet) and evaluation (FED/Form Evaluasi Diri or Self Evaluation Sheet). Therefore, it is common practice that each faculty member is conducting all three activities concurrently, which is shown in the column 'Years of Experience' of Table 6.1. The allocated time among the three activities does not have to be equal. Nevertheless, all of the activities must be performed. Most of the faculty members allocate more time in teaching and research activities than governmental/industrial practice.

Involvement – There are two ways for faculty member to be engaged in interaction with students, which are formal way (during the class) and informal way (outside the class). The informal interactions could take place during office hours or anytime the students drop by to meet with the faculty. Some faculty set specific office hours where the students are allowed to see them.

Appendix B contains an abbreviated resume for each program faculty member with the rank of instructor or above, as well as a brief relevant information of each faculty.

Besides these SEEI faculty members, some courses are taught by faculty from other schools. For example, Mathematics I/II and Engineering Mathematics I/II are taught by faculty from FMIPA (Faculty of Math and Natural Science), and Thermal Engineering & Fluid Mechanics are taught by faculty from FTMD (Faculty of Mechanical Engineering and Aeronautics). Almost all of first year courses are taught by faculty from other school (except Introduction to Circuit Analysis and Introduction to Engineering Design). Two of the core courses in the second year are taught by faculty from FMIPA. Four of the compulsory courses also taught by faculty member from other schools (environment courses, Religion and Ethics, Pancasila and Civic Education, and management courses).

Table 6-1. Faculty member Qualifications
Electrical Power Engineering Program

Faculty member Name	Highest Degree Earned- Field and Year				Rank	Type of Academic Appointment T, TT, NTT	FT or PT	Years of Experience			Professional Registration/ Certification	Level of Activity H, M, or L		
								Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Mervin Tangguar Hutabarat	Dr.Ir,M.Sc.	Integrated Circuits	PhD : University of London	2000	Associate Professor	T	FT	26	26	26	NCT	H	H	M
Umar Khayam	Dr, ST.,MT.	Electrical Engineering	PhD : Kyushu Institut of Teknology Japan	2008	Assistant Professor	T	FT	8	8	8	NCT IPM	H	H	H
Arif Sasongko	ST, M.Sc, Ph.D	Electronics	PhD : University Joseph Fourier Grenoble 1	2004	Assistant Professor	T	FT	10	10	10	NCT IPM	M	H	M
Amy Hamidah Salman	Ir, M.Sc	Electronics	PhD: ITB	2016	Assistant Professor	T	FT	34	34	34	NCT	H	H	M
Nanang Hariyanto	Dr.Ir, MT.	Electrical Engineering and Informatics	PhD : ITB	2010	Assistant Professor	T	FT	27	27	27	NCT	H	H	H
Achmad Munir	Dr.Eng.	System Engineering	PhD : Univ. Yamaguchi, Japan	2005	Assistant Professor	T	FT	7	7	7	NCT	H	H	H

Arwindra Rizqiawan	Dr.Eng, ST, MT.	Electrical Engineering	PhD : Shibaura Institute of Technology, Tokyo, Japan	2012	Assistant Lecturer	TT	FT	2	2	2	IPM	H	H	H
Ngapuli Irmea Sinisuka	Prof.Dr.Ir.	Materiaux Electrotechnique	PhD : Electrotechnique Toulouse, Toulouse, France	1978	Professor	T	FT	42	42	42	NCT	H	H	H
Muhammad Amin Sulthoni	Dr, ST, MT.	Physical Electronics	PhD : Tokyo Institute Technology, Japan	2012	Assistant Professor	T	FT	3	3	3	NCT	H	H	M
Eniman Yunus Syamsudin	Dr.Ir, M.Sc	Microelectronic Control	PhD : The Victoria University of Manchester	1992	Associate Professor	T	FT	31	31	31	NCT	M	H	H
Yusuf Kurniawan	Dr, ST, MT.	Electrical Engineering	PhD : ITB	2007	Assistant Professor	T	FT	8	8	8	NCT	M	H	M
Agung Wahyu Setiawan	Dr, Ir, ST, MT	Electrical and Informatics	PhD : ITB	2013	Assistant Professor	T	FT	3	3	3	IPM	H	H	H
Bambang Anggoro	Dr.Ir, MT.	Electromagnetic	PhD : ITB	2006	Associate Professor	T	FT	36	36	36	NCT	H	H	H
Suwarno	Dr. Ir,MT.	Material Isolation, Diagnosis Treeing and Partial Discharges	PhD : Nagoya University, Japan	1996	Professor	T	FT	26	26	26	NCT, IPU	H	H	H
Budiman Dabarsyah	Ir. MSEE	Communication System Theory	MASTER: University Southern California	1994	Assistant Professor	T	FT	26	26	26	NCT	M	H	M
Chairunnisa	Dr.Ing, ST, MT.	Electrical Engineering	PhD : Bochum Ruhr Universitat, Jerman	2007	Assistant Professor	T	FT	8	8	8	NCT	M	H	L
Elvayandri	S.Si, MT	Electrical Engineering	PhD : ITB	2002	Lecturer	T	FT	8	8	8	NCT	H	H	M

Farkhad Ihsan Hariadi	Ir, M.Sc	Electronics	MASTER: The University of Waterloo, Waterloo, Ontario	1991	Lecturer	T	FT	27	27	27	NCT	H	H	M
Syarif Hidayat	Dr. Ir,MT.	Electrical Engineering	PhD : University of Tokyo, Tokyo, Japan	1996	Associate Professor	T	FT	27	27	27	NCT	H	H	H
Deny Hamdani	Dr.-Ing.Ir.	Communication Engineering	PhD : Technical University of Dortmund, Dortmund, Germany	2012	Lecturer	T	FT	9	9	9	NCT	H	H	H
Agus Purwadi	Dr, Ir.	Electrical Engineering	PhD : ITB	2008	Assistant Professor	T	FT	30	30	30	NCT	H	H	H
Gibson Sianipar	Prof.Dr.Ir.	Electrique	PhD : Ecole Centrale de Lyon, Lyon, France	1984	Professor	T	FT	42	42	42	NCT	H	M	M
Muhammad Nurdin	Dr, Ir.	Genie Electrique	PhD : Institute National Polytechnique de Grenoble, Grenoble, France	1988	Associate Professor	T	FT	36	36	36	NCT	H	M	M
Tri Desmana Rachmildha	Dr, ST, MT.	Electrical Engineering	PhD : ITB	2009	Assistant Professor	T	FT	9	9	9	NCT	H	H	H
Carmadi Machbub	Prof.Dr.Ir.	Science de I'Ingenieu, Specialite Automatique et Informatique Industrielle	PhD : Ecole Centrale de Nantes, Nantes, France	1991	Professor	T	FT	35	35	35	NCT	H	M	H
Pekik Argo Dahono	Dr, Ir.	Electrical and Electronic Engineering	PhD : Tokyo Institute of Technology, Tokyo, Japan	1995	Associate Professor	T	FT	30	30	30	NCT	H	H	H

Reynaldo Zoro	Prof.Dr.Dipl.-Ing.Ir.	High Voltage Engineering	PhD : ITB	1999	Professor	T	FT	38	38	38	NCT	H	H	H
Yusra Sabri	Dr, Ir.	Electrotechnique	PhD : Institute National Polytechnique Toulouse, Toulouse, France	1983	Assistant Professor	NTT	PT	39	39	39	NCT	H	H	H
Burhanuddin Halimi	ST.,MT., Ph.D.	Nuclear Engineering	PhD : Seoul National University, Gwanak-Gu, Korea Selatan	2013	Assistant Professor	T	FT	2	2	2	IPM	H	H	H
Isnuwardianto	Dr, Ir.	Electrotechnique	PhD : Ecole Centrale de Lyon, Perancis	1991	Assistant Professor	T	FT	32	32	32	NCT	H	H	H
Djoko Darwanto	Dr, Ir	High Voltage Engineering	PhD : ITB	1989	Associate Professor	NTT	PT	39	39	39	NCT	H	H	H
Tutun Juhana	Dr, ST, MT	Telecommunication Engineering	PhD : ITB	2014	Associate Professor	T	FT	20	20	20	NCT	H	H	H
Iskandar	Dr, ST, MT	Telecommunication Engineering	PhD : Waseda University, Japan	2007	Associate Professor	T	FT	20	20	20	NCT	H	H	H

Instructions: Complete table for each member of the faculty in the program. Add additional rows or use additional sheets if necessary. Updated information is to be provided at the time of the visit.

1. Code: T = Tenured TT = Tenure Track NTT = Non Tenure Track
2. Code: FT = Full-time PT = Part-time Appointment at the institution.
3. Code: NCT = National Certification for Teaching, Internal Certification for Teaching, IPU=insinyur profesional utama (Senior professional engineer, highest degree)
   IPM=insinyur profesional madya (Intermediate professional engineer)
4. The level of activity (high, medium or low) should reflect an average over the year prior to the visit plus the two previous years.

Table 6-2. Faculty member Workload Summary
Electrical Power Engineering Program

Faculty member (name)	PT or FT	Classes Taught (Course No./Credit Hrs.) Term and Year				Program Activity Distribution			% of Time Devoted to the Program
						Teaching	Research or Scholarship (%)	Other	
Achmad Munir	FT	Introduction to Circuit Analysis	EL1200	2	Semester II – 2016/2017	13	91		15.38
		Telecommunication Laboratory 1	ET2100	1	Semester I – 2016/2017				
		Radio Frequency Electronics	ET3006	3	Semester I – 2016/2017				
		Radio Frequency Electronics	ET3006	3	Semester II – 2016/2017				
		Telecommunication Laboratory 3	ET3100	1	Semester I – 2016/2017				
		Advanced Radio Frequency Electronics	ET4056	3	Semester I – 2016/2017				
Agung Wahyu Setiawan	FT	Digital System and Microprocessor	EL2142	4	Semester I – 2016/2017	10	37		40
		Instrumental Systems	EL3013	3	Semester II – 2016/2017				
		Biomedical Engineering	EL4132	3	Semester I – 2016/2017				
Agus Purwadi	FT	Electric Machinery	EP3071	3	Semester I – 2016/2017	6	63		100
		Applications of Electrical Motors	EP4075	3	Semester II – 2016/2017				
Amy Hamidah Salman	FT	Introduction to Circuit Analysis	EL1200	2	Semester II – 2016/2017	11	38		18.18
		Biomedical Engineering Laboratory I	EB2200	2	Semester II – 2016/2017				
		Biomedical Electronics	EB2206	3	Semester II – 2016/2017				
		Electronics II	EL3009	3	Semester II – 2016/2017				
		Electronics II Laboratory	EL3109	1	Semester I – 2016/2017				
Arif Sasongko	FT	Digital Systems	EL2002	4	Semester I – 2016/2017	22.2	26		9.46
		Digital Systems Laboratory	EL2102	1	Semester I – 2016/2017				
		Introduction to Circuit Analysis	EL1200	2	Semester II – 2016/2017				
		Introduction to Circuit Analysis	EL1200	0.1	Semester II – 2016/2017				
		Signals & Systems	EL2007	3	Semester II – 2016/2017				
		Final Project I (Capstone Design)	EL4090	3	Semester I – 2016/2017				
		Final Project II (Capstone Design)	EL4091	0.1	Semester II – 2016/2017				
		Industrial Internships	EL4094	9	Semester II – 2016/2017				
Arwindra Rizqiawan	FT	Introduction to Circuit Analysis	EL1200	1.9	Semester II – 2016/2017	8.1	51		70.37

Faculty member (name)	PT or FT	Classes Taught (Course No./Credit Hrs.) Term and Year				Program Activity Distribution			% of Time Devoted to the Program
						Teaching	Research or Scholarship (%)	Other	
		Electric Circuits	EL2001	2.8	Semester I – 2016/2017				
		Electrical Power Systems	EL3017	2.4	Semester II – 2016/2017				
		Electrical Power Distribution Systems	EP4077	1	Semester I – 2016/2017				
Bambang Anggoro Soedjarno P.	FT	Electromagnetics	EL2006	3	Semester I – 2016/2017	7.8	58		100
		Electromagnetics	EL2006	3	Semester II – 2016/2017				
		Electric Power Plants	EP3070	1.8	Semester II – 2016/2017				
Budiman Dabarsyah	FT	Probability and Statistics	EL2004	1.5	Semester II – 2016/2017	5.5	85		72.72
		Electromagnetics	EL2006	4	Semester II – 2016/2017				
Burhanuddin Halimi	FT	Electrical Power Engineering	EP2274	2	Semester I – 2015/2016	11.2	59		55.36
		Electric Power Plants	EP3070	1.2	Semester II – 2015/2016				
		Electrical Power System	EL3017	3	Semester II – 2015/2016				
		Electrical Power Laboratory 1	EP3171	2	Semester I – 2015/2016				
		Electrical System Project Management	EP4050	3	Semester II – 2015/2016				
Carmadi Machbub	FT	Control Systems	EL3015	3	Semester I – 2016/2017	6	65		100
		Control Systems	EL3015	3	Semester II – 2016/2017				
Chairunnisa	FT	Electromagnetics I	ET2000	3	Semester I – 2016/2017	16	20		18.75
		Electromagnetics II	ET3000	3	Semester I – 2016/2017				
		Electromagnetics I	ET2000	3	Semester II – 2016/2017				
		Electromagnetics II	ET3000	3	Semester II – 2016/2017				
		Telecommunication Laboratory IV	ET3200	1	Semester II – 2016/2017				
		Electromagnetics	EL2006	3	Semester II – 2016/2017				
Deny Hamdani	FT	Signal and System	EP2094	3	Semester II – 2016/2017	18	0		100
		Numerical Analysis for Electrical Power	EP3073	3	Semester I – 2016/2017				
		Final Project I and Seminar	EP4096	2	Semester I – 2016/2017				
		Final Project I and Seminar	EP4096	2	Semester II – 2016/2017				
		Final Project II	EP4099	4	Semester I – 2016/2017				
		Final Project II	EP4099	4	Semester II – 2016/2017				
Djoko Darwanto	PT	High Voltage Engineering	EP3074	3	Semester II – 2015/2016	5	0		60

Faculty member (name)	PT or FT	Classes Taught (Course No./Credit Hrs.) Term and Year				Program Activity Distribution			% of Time Devoted to the Program
						Teaching	Research or Scholarship (%)	Other	
		Electromagnetics Compability	EL5275	2	Semester II – 2015/2016				
Elvayandri	FT	Electronics	EL2005	3	Semester I – 2016/2017	9	0		66.67
		Electronics	EL2005	3	Semester II – 2016/2017				
		Electronics II	EL3009	3	Semester I – 2016/2017				
Eniman Y. Syamsuddin	FT	Electric Circuit	EL2001	4	Semester I – 2016/2017	10	0		100
		Control System	EL3015	3	Semester I – 2016/2017				
		Control System	EL3015	3	Semester II – 2016/2017				
Farkhad Ihsan Hariadi	FT	Electronics	EL2005	3	Semester II – 2016/2017	9	9		33.33
		Electronics II	EL3009	3	Semester I – 2016/2017				
		Microprocessor Systems	EL3014	3	Semester II – 2016/2017				
Gibson H. Sianipar	FT	Numerical Analysis For Electrical Power	EP3073	3	Semester I – 2016/2017	9	31		33.33
		Operation and Control of Power System	EL5172	2	Semester II – 2016/2017				
		Power System Computation	EL6074	2	Semester I – 2016/2017				
		Implementation of Power System Optimization	EL6172	2	Semester II – 2016/2017				
Iskandar	FT	Analog and Digital Communication Systems	ET3001	3	Semester I – 2015/2016	10.1	36		59.41
		Analog and Digital Communication Systems	ET3001	3	Semester II – 2015/2016				
		Final Work I & Seminar	ET4001	2	Semester I – 2015/2016				
		Final Work I & Seminar	ET4001	2	Semester II – 2015/2016				
		Final Work I & Seminar	ET4001	0.1	Semester II – 2015/2016				
Isnuwardianto	FT	Professional & Community Development	EL4093	3	Semester I – 2016/2017	9	0		100
		Professional & Community Development	EL4093	3	Semester II – 2016/2017				
		Industrial Cooperative	EP4193	3	Semester II – 2016/2017				
Ngapuli Irmea Sinisuka	FT	Probability & Statistics	EP2091	3	Semester I – 2016/2017	6	52		100
		Electric Energy Application	EP4071	3	Semester I – 2016/2017				
Mervin Tangguar Hutabarat	FT	Introduction to Circuit Analysis	EL1200	2	Semester II – 2016/2017	19	12		57.89
		Electric Circuits	EL2001	4	Semester I – 2016/2017				
		Electronics	EL2005	3	Semester II – 2016/2017				
		Electric Circuits Laboratory	EL2101	1	Semester I – 2016/2017				

Faculty member (name)	PT or FT	Classes Taught (Course No./Credit Hrs.) Term and Year				Program Activity Distribution			% of Time Devoted to the Program
						Teaching	Research or Scholarship (%)	Other	
		Electronics Laboratory	EL2205	1	Semester II – 2016/2017				
		Electronics II Laboratory	EL3109	1	Semester I – 2016/2017				
		Electronics II Laboratory	EL3109	1	Semester II – 2016/2017				
		Final Project I (Capstone Design)	EL4090	3	Semester I – 2016/2017				
		Final Project II (Capstone Design)	EL4091	3	Semester II – 2016/2017				
Muhammad Amin Sulthoni	FT	Electric Circuits	EL2001	4	Semester I – 2016/2017	12	9		75
		Electric Circuits	EL2001	4	Semester II – 2016/2017				
		Electric Circuits Laboratory	EL2101	1	Semester I – 2016/2017				
		Electrical Engineering Materials	EL3012	3	Semester I – 2016/2017				
Muhammad Nurdin	FT	Power System Analysis	EP3075	3	Semester I – 2016/2017	3	54		100
Nanang Hariyanto	FT	Introduction to Circuit Analysis	EL1200	2	Semester II – 2016/2017	6.8	29		91.17
		Electric Circuits	EL2001	1.2	Semester I – 2016/2017				
		Electrical Power Systems	EL3017	0.6	Semester II – 2016/2017				
		Relay Protection	EP4079	3	Semester I – 2016/2017				
Pekik Argo Dahono	FT	Power Electronics	EP3072	2.4	Semester II – 2016/2017	4.4	71		100
		Selected Topics in Electrical Power	EP4073	2	Semester I – 2016/2017				
Reynaldo Zoro	FT	Power System Protection	EP3076	3	Semester I – 2016/2017	6	0		100
		Power System Protection	EP3076	3	Semester II – 2016/2017				
Suwarno	FT	Electromagnetic Field	EL2006	3	Semester II – 2016/2017	6	74		100
		Electrical Engineering Material	EP3095	3	Semester I – 2016/2017				
Syarif Hidayat	FT	Measurement System	EP2076	3	Semester II – 2016/2017	10	10		100
		Electrical Power Design System	EP4070	2	Semester I – 2016/2017				
		Electrical Power Design System	EP4070	2	Semester II – 2016/2017				
		SCADA and Energy Management	EP4072	3	Semester I – 2016/2017				
Tri Desmana Rachmildha	FT	Electrical Power Engineering	EP2274	2	Semester I – 2016/2017	3	34		100
		Electrical Power Laboratory II	EP3172	1	Semester II – 2016/2017				
Tutun Juhana	FT	Telecommunication Laboratory Works 2	ET2200	1	Semester II – 2016/2017	6	49		33.33
		Computer Network	ET3003	2	Semester I – 2016/2017				

Faculty member (name)	PT or FT	Classes Taught (Course No./Credit Hrs.) Term and Year				Program Activity Distribution			% of Time Devoted to the Program
						Teaching	Research or Scholarship (%)	Other	
		Computer Network Security	ET4045	3	Semester I – 2016/2017				
Umar Khayam	FT	Introduction to Circuit Analysis	EL1200	2	Semester I – 2016/2017	14	58		100
		Introduction to Circuit Analysis	EL1200	2	Semester II – 2016/2017				
		Electrical Power Systems	EL3017	3	Semester I – 2016/2017				
		High Voltage Engineering	EP3074	3	Semester II – 2016/2017				
		Industrial Experience	EP4091	2	Semester I – 2016/2017				
		Industrial Experience	EP4091	2	Semester II – 2016/2017				
Yusra Sabri	PT	Electrical System Project Management	EP4050	3	Semester II – 2015/2016	10	0		60
		Electric Power Distribution Systems	EP4077	3	Semester I – 2016/2017				
		Energy Economics	EL5079	2	Semester II – 2016/2017				
		Electric Power Distribution Planning	EL6171	2	Semester II – 2016/2017				
Yusuf Kurniawan	FT	Digital System	EL2002	4	Semester II – 2016/2017	8	21		50
		Digital System and Microprocessor	EL2142	4	Semester I – 2016/2017				

Notes : 1. Teaching parameter is measured by total credit hours taught by the faculty member.

2. Research or Scholarship is measured by the number of research projects the faculty member is involved in divided by total research projects conducted in the school in 2016.

D. Faculty member Development

The Ministry of Higher Education and Research has demanded for each faculty member in a university to be nationally certified by a national board through its standard portfolio examination which includes course (teaching) portfolio. Through this certification, each faculty member will be entitled a salary incentive from the Ministry through the university. The university has a yearly plan to propose the number of the faculty members for each school/faculty member to submit for the certification. All faculty members that have not been nationally certified, by the university policy, has undertaken an internal certification using a similar standard.

Not necessarily for this purpose, the university has had several schemes to develop the faculty member in the area of teaching and research. The Directorate of Education (Dirdik) of the university in cooperation with Human Resource Development Office (PMO) has a regular workshop for all faculty members in the university (4 times a year). Among the relevant workshops, some of them are about portfolio preparation, applied approach in higher education teaching, student centered learning, scientific writing, and research proposal writing. The directorate also offers various competitive grants upon proposal submission, e.g. teaching improvement grant, teaching material development, e-learning (blended learning) method and teaching material development.

The Research Office provides competitive research grants from various sources of funding. There are incentives for each faculty member who have already published their works according to the types and impact of the publications.

The School of Electrical Engineering and Informatics has allocated funding each year for each faculty members to be a member of international of one professional organization such as IEEE (Institute of Electrical and Electronics Engineers) and ACM (Association for Computing Machinery). Currently, there are 40 faculty members who are registered as IEEE members and 13 faculty members as ACM members in 2016. The school gives funding as well to the faculty for attending conferences, publishing journals, managing/organizing journals and conferences.

E. Authority and Responsibility of Faculty member

Electrical Power Engineering Program stands under the School of Electrical Engineering and Informatics which is led by a Dean. The Dean is responsible for everything inside the school including all of the faculty. In doing his/her job, the Dean is assisted by Vice Dean for Academic Affairs, Vice Dean for Resources, Heads of Research Groups, Heads of Laboratories, and Program Chairs. Vice Dean for Academic Affairs is responsible for curriculums of all programs under the school, while Vice Dean for Resources is responsible for human resource development, finance, and other resources. Research Group is the smallest unit under the school consisting of faculty members with similar field of competency/knowledge. Laboratory is the place where faculty members, technicians, and

administration staff stay to teach, conduct researches, and do administration works led by the Head of Laboratory. And finally, the Program chair is responsible in coordinating and supervising the program.

Basically, the Electrical Power Engineering Program Chair is responsible to run the program. The Chair has the rights to recommend faculty member assignment to teach certain courses, while Research Group Heads would give opinion to the recommendations. The Chair together with the Dean are also responsible to ensure all the courses to run well according to their syllabi. If there is any faculty member for any reason could not deliver the course accordingly, then the Chair could recommend an action to the Dean to overcome this problem. At the end of the semester, the Chair makes a report to the Dean containing recommended actions that should be taken to further improve quality of the courses.

Faculty member assigned to a certain course is responsible in carrying the courses according to its current syllabus. Evaluating the course can be done during the course based on his/her experience and the students' questionnaire results at the end of each semester. In order to ensure the quality and consistency of the way those courses run, faculty member has to write a course portfolio which contains the course progress and report it to the Chair. Later, based on both the students' questionnaire results and the course portfolio, the Chair can take any further action if necessary.

In addition, a group of faculty member who teach the same or similar course are assigned to evaluate, propose modifications to the course, and create a new syllabus if necessary. The proposed modified or new created courses are then processed by curriculum committee, and then to school's senate, and followed by the Executives. Small modifications of course syllabi are entrusted to the responsible faculty member in which the modifications must be approved before used by the program chair. Lastly, the curriculum committee evaluates all the syllabi in order to ensure the course's objectives and the educational objectives are achieved accordingly.

CRITERION 7. FACILITIES

In the recent three years, there are five newly-built buildings in ITB served as laboratories and classrooms. The recent development included the new campus area as wide as 46 Ha in the eastern part of Bandung, called Jatinangor. However, currently the facilities in the new campus are not used by Electrical Power Engineering program. Hereafter, the facilities described in the following section would only focus in the main campus of ITB.

The total area of facility used by the school and its laboratories (excluding classroom) is 14.775 square meter. Within these areas, 5.754 square meters are used as laboratories utilized by EPE program. These laboratories are mainly located in two buildings, which are Electrical Energy Conversion Laboratory Building and Gedung Kerma PLN.

A. Offices, Classrooms and Laboratories

A.1 OFFICES

Administrative

Administrative office is centralized in SEEI main office. Basic office equipment for staff are desktop computers, printer, telephone, full gigabyte internet access, printer & scanner, and wireless access point. In addition, a professional photocopier machine is also available in this office for all staffs and faculty members. Each of the Desktop PCs above is connected to the Campus Internet Backbone.

Faculty

Each faculty member has a private or a shared office room with at least basic office equipment such as desk, chair and small cabinet. These office rooms are typically occupied by one person (of a 20 square meters room in average) and up to two persons (of a 40 square meters room in average). Some office rooms are completed with a small lounge for three to six people either inside or outside the rooms. There is also a meeting room available in each laboratory where faculty members of EPE program held a meeting or gathering once a week.

Each faculty member is also provided a standard laptop with access to gigabit Ethernet connection. Printer and scanner are available in each faculty room. Shared printer is available in each laboratory while photocopy machines are also available in SEEI office and several laboratories. Additionally, campus-authenticated wireless connectivity is widely accessible via numerous wireless access points in the building. There is a dedicated proxy server, which is accessible only for faculty members and administrative/clerical staffs. This proxy server is not connected to the Campus Internet backbone, and is used only for backups in case a problem occurs with campus-wide Internet.

Clerical

Each laboratory has its own clerical office, which is occupied by one to three people per room. Basic equipments in clerical office are desktop computers with internet access, printer and telephone. Mostly the job description for the clerical staff are to help the faculty member, program chair and some other staff regarding administrative matters.

Teaching Assistants

Teaching assistants here include laboratory assistants and last year's students who do research on their final projects. They are provided shared office rooms in each building that can be occupied by six to fifteen people per room with private space about two square meters. There are total six shared rooms within the two EPE buildings. All teaching assistants have access to computer, printer and internet access.

A.2 CLASSROOMS

There are 41 common classrooms utilized by EPE program which are distributed throughout various building in ITB campus. Their capacities range from 30 up to 200 seats. They are equipped with blackboard/whiteboard, and overhead projector. LCD projector and multimedia equipment are available as well in most of the classrooms.

Apart from those common classrooms, there are also classrooms in the laboratories of School of Electrical Engineering and Informatics which can be accessed exclusively by EPE program. The total area of the classroom within the laboratories is 2.690 square meters. Most of these classrooms have a video projector and multimedia facilities.

Classrooms for lectures that are held in EPE laboratories have average capacity of 50 to 60 people which is adequate for EPE program whose students in one year are approximately 40 people. The rooms are typically wide enough flat-type rooms, allowing the lecturer and the students to interact directly and condusively. Wi-Fi is also available throughout the buildings to accommodate learning activities at any time.

A.3 LABORATORIES

Students can conduct laboratory course in each SEEI laboratory. Most final projects are conducted in EPE laboratories although students still have access to other SEEI laboratories if necessary. Moreover, there are other laboratories outside SEEI which are accessible to EPE Program student. Each laboratory has their administrative staff and technicians. All of the laboratory has access to the Internet and has rooms for student residency.

ITB Common Laboratories

Common Laboratories in ITB which are accessible by EPE students are as follows:

- **Basic Science Laboratorium**, which provides physics and chemistry laboratory facility for all first year students in ITB. This laboratory is run by FMIPA (Faculty of Mathematics and Natural Science).
- **Microelectronic Center.** The ME Center has established itself as the most active microelectronics research center in Indonesia. It has attracted government as well as industrial/private sector funding for R&D in microelectronics and electronics industry. Currently, the ME Center is focusing on system-on-a-chip, smartcard, and telecommunication chip design. This center is also supporting education and opens to the EPE students for supporting their final projects. Since 2016, the Microelectronics center has been given mandate from goverment to become excellent research center on broadband wireless access. There are some research bugdet allocated from government to this research center.

SEEI Laboratories

There are 17 laboratories which belong to SEEI that serve the purpose of supporting educational program and conducting research activities. Therefore, the funding of these laboratories comes from not only from educational budget but also from research budget. However, the core and breadth courses with laboratory works are performed at only six laboratories to support course Electric Circuits Laboratory (EL2101, EL2205) which consists of Electric Circuits (EL2001), Digital & Microprocessor Systems (EL2142), and Electronics (EL2005) course; and Electrical Power Laboratory I and II (EP3171, EP3172) which consists of Electric Machines (EP3071) , Power System Analysis (EP3075), Control Systems (EL3015), Power Electronics (EP3072), High Voltage Engineering (EP3074), Power System Protection (EP3076). Beside educational purposes, these laboratories are also used to host students for their final projects and research.

Table 7.1 resumes the laboratory courses and the facility, while the equipment list in detailed (quantity and specifications) in each laboratory can be seen in the Appendix C.

Table 7.1 Summary of Facilities in Laboratories

Laboratory	Classroom	Workshop/ Working Room	Library	Faculty Room	Administration	Other	Total (m2)	Courses served by lab
Basic Electrical Engineering	0.00	326.00	-	-	64.00	45.00	435.00	EL2101 EL2142 EL2205 EL2001 EL2005
Control & Computer Systems	382.50	317.75	-	230.25	76.50	147.00	1,154.00	EP3171 EL3015
Electrical Energy Conversion	1,565.00	153.00	56.00	250.00	46.00	187.47	2,257.47	EP3171 EP3172 EP3071 EP3072
Power System & Electrical Distribution	77.00	45.00	-	136.00	-	21.60	279.60	EP3075 EP3171 EP4077 EP4072
High Voltage & High Current	467.25	316.00	-	191.00	70.00	583.25	1,627.50	EP3074 EP3076 EP3172

The following is detailed description of each laboratory in SEEI.

BASIC ELECTRICAL ENGINEERING LABORATORY.

Basic Electrical Engineering laboratory is a facility dedicated for educational program. This laboratory currently uses four rooms whose capacities for conducting laboratory work for 126 students (two rooms with capacity of 30 students, one room with capacity of 34 students and one room with capacity of 32 students). The total area of those rooms is 326 square meters.

There are nine laboratory courses hosted in this laboratory: electric circuit laboratory, electronics laboratory, digital laboratory, and microprocessors system and lab, electronic lab II, digital signal processing laboratory, control system laboratory, communication system laboratory, and power systems laboratory. EPE program only uses this laboratory for electric circuit laboratory and electronics laboratory.

Basic equipments in this laboratory are digital multimeter, signal generator, oscilloscope, voltage adapter, frequency counter, X-Y recorder, various FPGA board, digital power meter, autotransformer, logic probe, logic pulser, panel meter, RF generator, function generator, logic analyzer, DSP development boards, microprocessor board, and a lot of educational modul. This laboratory is also equipped with set of personal computers which are connected to the Internet.

The equipments used for each coursework in EPE program are

- EL2101 Electric Circuit Laboratory uses basic measurement tools (multimeter), oscilloscopes, educational kits, function generators, power supply
- EL2205 Electronics laboratory uses basic measurement tools (multimeter), oscilloscopes, educational kits, function generators, power supply

The funding of this laboratory is mainly from SEEI's annual budget, which is enough for operational, maintenance, and upgrading. It also receives some equipments from government program and alumni donation. Every beginning of a semester, program chair and head of Basic Laboratory reserves some fund for operational cost of these labwork courses. This lab recrutes many laboratory assistants mostly senior students and graduate students.

CONTROL AND COMPUTER SYSTEMS LABORATORY E

The Control and Computer Systems Laboratory is also a research laboratory. Its main activity is research. However, it supports also some electives course. For EPE program, Control and Computer Systems Laboratory is used for control systems laboratory (EL3215) using experimental kits. In addition to those kits, the major equipment in this laboratory are digital oscilloscopes, multimeter, function generator, digital X-Y recorder, tool sets, and DC motors.

ELECTRICAL ENERGY CONVERSION LABORATORY

This laboratory has various electric machinery (DC machines, synchronous machines, asynchronous machine in various size). There are one phase, and three phase

transformer, tables for laboratory work, instrumentation facility for power electronics (oscilloscope, multimeter), motor controller based on micro controller and PC, and programmable logic controller (PLC). The Electrical Energy Conversion Laboratory mainly serves the Power Engineering Program for:

- Electrical Machinery Laboratory using transformers (one phase and three phase), DC machinery, synchronous and asynchronous AC machinery kits.
- Power Electronics Laboratory using static switches, AC-DC rectifier, DC-DC converter, DC-AC inverter kits.

POWER ENGINEERING AND HIGH CURRENT LABORATORY

This laboratory facilitates researches that are mainly for Electrical Power Engineering program. The facilities are divided into five groups as follows :

- Generation and measurement of high voltage laboratory (for AC, DC, Impulse)
- Electrical material isolation laboratory
- Electrical measurement laboratory
- Power protection system laboratory
- Electrical calibration laboratory

This laboratory is also equipped by: inductor load, capacitor load, impedance load, transformer, resistive load, diode, gas tube, vacuum tube, galvanometer, standard resistor, standard battery, Ampere/millivoltmeter for AC and DC, portable recorder, three phase meter, frequency meter, kWh meter, taco generator, etc.

POWER SYSTEM AND ELECTRICAL DISTRIBUTION LABORATORY

Power System and Electrical Distribution Laboratory only serves the Electrical Power Engineering program. The laboratory has a SCADA room, equipment/tools frequency meter, phase meter, stabilizer, timer, kWh meter, RS relay, VAR meter, and flux meter. This laboratory supports several laboratory modules including:

- Power Systems Analysis Laboratory
- Power Systems Distribution Laboratory
- SCADA Laboratory

B. Computing Resources

Campus Wide Support

Directorate of Information System & Information Technology (DITSTI / Direktorat Sistem & Teknologi Informasi) provides a campus wide internet and computing resources. It provides computing support for education, research, and administrative applications for the university community. The networking facilities provided by DSTI comprise a fiber optic Gigabit Ethernet backbone. All buildings in ITB main campus are connected through Gigabit fiber optic. All faculty offices, classrooms and PC labs are connected to the network along with several ITB administration offices that are not in the main campus. Figure 7.1 shows the network map throughout the campus. This directorate has just expanded their scope of work, personnel and their status (2015).

- COMLABS. Comlabs is a common computer facility for ITB students, which is managed by DITSTI. It has four computers rooms with total approximately 160 computers, which all of them are connected to Internet. It also provides various trainings (and some with certification such as microsoft, application software, statistics software, etc) on computer and network, and licenses for some software (in cooperation with microsoft, wolfram, etc). In addition, some laboratory courses are held in Comlabs. It can also be used for online examination since the student can access the computers in this lab.

Workstations

Access to workstation is provided by Basic Informatic Laboratory and COMLABS.

Software

There is various software used in EPE program laboratory courses. The licensed software is installed in one personal computer, which are accesible for many students using remote desktop during laboratory course.

Some of these software are listed below :

Table 7.2. List of software used in EPE program

Software	Description	Course
Matlab & Simulink	Mathematical simulation	Electrical Power Laboratory II
MAXPLUS, Quatrus, Xilinx ISE, Xilinx Foundation	FPGA Synthesys tools	Electronics Laboratory
WinSPICE, PSpice	Circuit simulation	Electric Circuits Laboratory
PSSE, DigSilent Power Factory	Power system simulation	Electrical Power Laboratory I
Arduino	Digital System and microprocessor	Digital System and microprocessor Laboratory
PSIM	Power electronics	Electrical Power Laboratory II

Campus wide licenses are available for the following softwares:

- Mathematica Wolfram
- SAS
- Minitab
- Microsoft Windows
- Microsoft Robotics Studio
- Microsoft Office 365
- Microsoft Dreamspark software package

Internet Access

ITB has several connections to internet as follows:

- International link : 2.2 Gbps
- Domestic link (Indonesian Internet Exchange) : 0.8 Gbps
- Backup link : 0.5 Gbps
- TEIN (RnD Network) : 622 Mbps

All buildings in ITB are connected with gigabit ethernet fiber optic connection, as shown in Figure 7.1

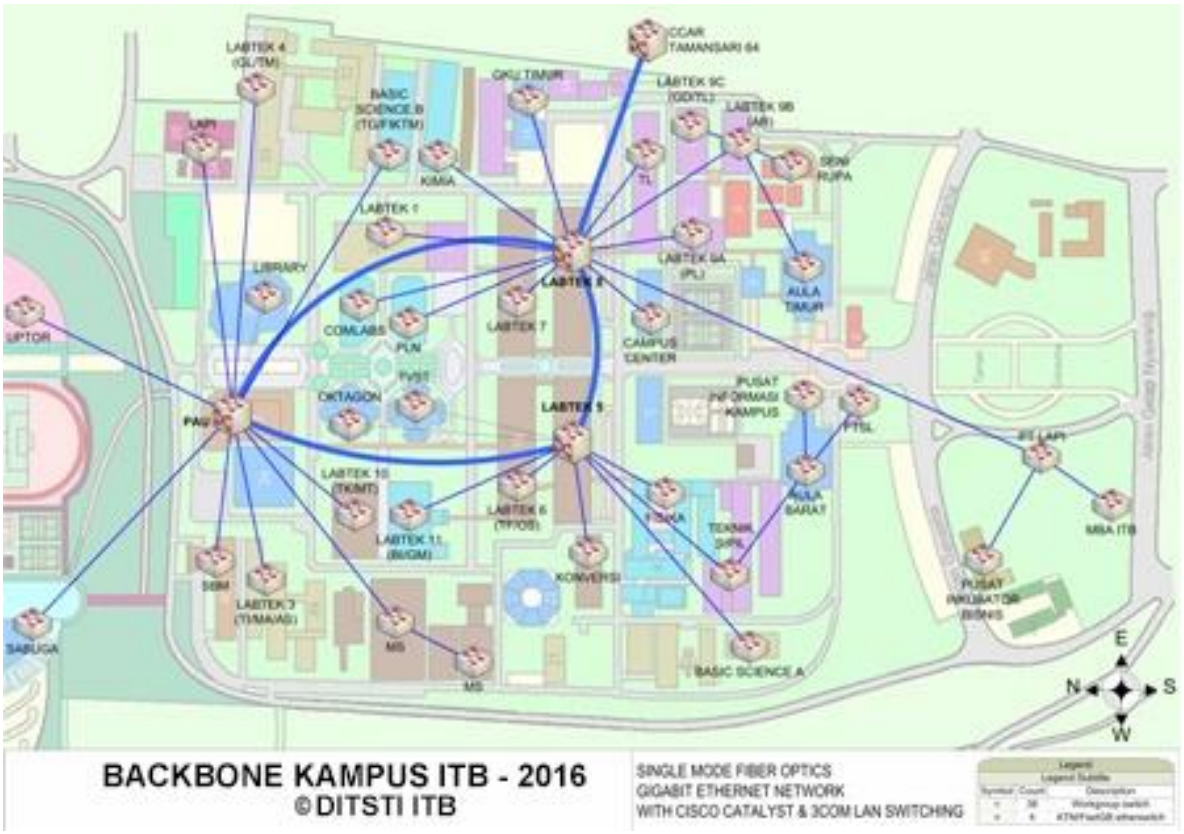


Figure 7.1 ITB Fiber Optic Backbone

C. Guidance

- In structured laboratory class, each student must learn how to use each equipment in a particular assignment before they enter the laboratory. Additionally, before the class begin, teaching assistants make sure that the students understand how to use the tools and equipments. During the class, teaching assistants constantly monitor how the students use the equipment.
- Detailed procedures on how to use the equipments are included in the first modules of each laboratory course.
- Training material with step-by-step instruction for laboratory class are provided and the students are encouraged to read them before laboratory class.
- DITSTI provides all new student compulsory training on how to use basic network facilities in ITB. The training is prerequisite to have access to ITB network. After completing the training, the students are provided user ID and password to access various campus wide internet resources.

Safety Regulation

Electrical Power Engineering program is trying to ensure that all academic processes implemented meet safety standards. Some policies are applied including:

1. Preparation and implementation of safety standards and procedures for working in laboratories.

SOP for laboratory equipments are provided in each laboratory. Safety Induction is even included into one whole module in some laboratory courses prior to the main modules.

2. Socialization of safety requirement through a safety induction. This activity is in collaboration with the ITB 's Directorate of Work and Environmental Security, Health, and Safety (UPT 3KL) which organizes safety induction and training of fire fighting on a regular basis, which is addressed to faculty, staff, and students of ITB. Each student is required to attend a safety induction ITB at least one time. Pictures of the last safety drill held in EPE program are shown in Figure 7.2.
3. Completion of safety equipments includes emergency signs, floormap and evacuation routes, and fire extinguishers.

(a) Students evacuation

(b) Fire trucks and ambulance arrival

(c) Briefing at Gathering Point

Figure 7.2 Documentation during Safety Drill in Gedung Kerma PLN

D. Maintenance and Upgrading of Facilities

ITB have prioritization for activity and budget. The academic activities are given as the first priority including for facility used for education. ITB bugdet are categorized into two groups, which are operational activities and transformation activities. Transformation (Program Pengembangan) activities cover maintenance and upgrading of facility among other things. When the facility is related to academic activity especially teaching, they will given hing priority. A sum of IDR 239.202.000,- was allocated from ITB bugdet 2016 for maintenance and operational costs of facilities and equipment. In addition, ITB head office also allocated IDR 1.656.933.900,- for procurement of laboratory facilities. The other sources of fund to improve the facility come from the Ministry of Research, Technology, and Higher Education and alumni. The detailed of this funding can be seen in the Table 8.2.

SEEI has reserved yearly budget for each program. The chair allocates some of the bugdet for operational and upgrading laboratories. Mainly, EPE program uses the bugdet for operational and upgrading equipment in Electrical Energy Conversion Laboratory, Power Engineering and High Current Laboratory, and Power System and Electrical Distribution Laboratory since most of EPE lab course and research on final projects are done in these laboratories. The Head of each laboratory has plan for three year. He propose to the program chair the operation and upgrade of the laboratory.

As for the other laboratories which mostly are managed under Electrical Engineering Program are supported by SEEI yearly budget allocated for the program.

E. Library Services

The SEEI relies on the university network/computing services (USDI) for support on computing and networking facilities. The role of both the logistic unit and the facility and infrastructure directorate in supporting the SEEI have also been described therein.

With respect to the central library it is considered as a science and engineering library. Nearly 78% of its collection is related to the fields of science and engineering. The collection includes books, periodicals, proceedings, theses, reports, and electronic resources. The library has acquired a good number of electronic databases and Internet resources, and has established searching mechanisms for such databases. Faculty and students have Intranet and Internet remote access to almost all the databases using the library's URL http://www.lib.itb.ac.id/.

The summary of the library's collection is presented in Table 7.3.

Table 7.3 Summary of Central Library Collections

Digital Collections:
Total Collection ~ 170,000 titles
1. Elsevier ScienceDirect Freedom Collection
2. The IEEE/IET Electronic Library
3. Pro Quest :
1) ProQuest Science Journal
2) ProQuest Dissertation & Thesis (Sci & Eng.)
3) ProQuest ABI/INFORM Global (BPO Global)
4) ProQuest Art, Design and Architecture Collection
5) ProQuest Art & Humanities
6) ProQuest Nursing & Allied Health Source
4. American Chemical Society (ACS)
5. Springer e-Journals – Engineering
6. SIAM Journal : Society of Industrial and Applied Mathematics
7. American Institute of Physics (AIP)
8. American Society of Civil Engineers (ASCE)
9. Ebsco Science Reference Center
10. Ebsco Art and Architecture
11. Academic Search Complete
12. ACM Digital Library
13. Mathscinet : American Mathematical Society (AMS)
The Central Library physical collection:
1. Total title ~ 236,000 titles
2. Total volume ~ 266,078 exemplar
Subject:
86%: Science (33.15%), Engineering (44.81%), Art (8.04%)
14%: General (Religion, Psychology, Soft skill)

F. Overall Comments on Facilities

In general, facilities in ITB are more than adequate to run the EPE program. However, some improvement still can be done. As for other facilities such as classrooms, equipments, offices, the EPE program (and ITB in general) stil has some spare of them. Therefore, we do not expect that there would be shortcoming in facilities in the near future (about five years from now). Other descriptions on ITB facilities can be seen at: https://www.itb.ac.id/ which describes some of ITB facilities.

Besides our institution, the EPE program gets a lot of donation form various sources. Usually, the donators ask the kind of equipments needed. Table 7.4 shows a list of donation in 2015.

Table 7.4 List of Donation (Goods & Services) in 2015

No	Goods/ Service Name	Specification	Quantity		Year	Placement	Source
1	Lab Maintenance Works	Component & Control repair of the High Voltage Lab Equipment	1	Package	2015	Power Engineering and High Current Lab	Dhira Diantari Juzar on behalf of Dr.Ir. Aidil Juzar, S.E., EE Alumni, entry year 1958
2	Lab Equipment Maintenance	Service 3 High Voltage Trafo and repair of 1 High Voltage Trafo	1	Package	2015	Power Engineering and High Current Lab	Dhira Diantari Juzar on behalf of Dr.Ir. Aidil Juzar, S.E., EE Alumni, entry year 1958
3	Interior Renovation Works	Discussion Room Renovation/ Mezanin in Electrical Energy Conversion Laboratory ITB (Tahap I)	1	Package	2015	Electrical Energy Conversion Lab	Dhira Diantari Juzar on behalf of Dr.Ir. Aidil Juzar, S.E., EE Alumni, entry year 1958
4	DCA Pro	Atlas DCA Pro (DCA75)	6	Unit	2015	Basic EE Lab	Alumni EE entry year 1983

5	Function Generator	Rigol DG1022U	10	Unit	2015	Basic EE Lab	Alumni EE entry year 1983

No	Goods/ Service Name	Specification	Quantity		Year	Placement	Source
6	Digital Multimeter	Rigol DM3058E	18	Unit	2015	Basic EE Lab	Alumni EE entry year 1983
7	Microbus	HINO / DUTRO 110 SDBL BODY PS, WU302R–HKMLHD3BL (110SDBL)	1	Unit	2015	SEEI ITB Jatinangor Campus	Korea International Cooperation Agency KOICA)
8	Minibus	HINO, FB2WGLZ – EN/FB 130	1	Unit	2015	SEEI ITB Jatinangor Campus	Korea International Cooperation Agency (KOICA)
9	ITB-KOREA Cyber Security R&D Center Building	Cyber Security Master Course and R&D Program	1	Package	2015	SEEI ITB Jatinangor Campus	Korea International Cooperation Agency (KOICA)

CRITERION 8. INSTITUTIONAL SUPPORT

A. Leadership

Referring to the Rector Decree No.012/SK/K01/0T/2005, ITB basically adheres to the matrix organization between Resources (e.g. faculties, facilities, infrastructures, and finance) and Programs (e.g. Educational Program, Research Program, Community Service/Cooperation Program).The smallest organization unit that has the authority to access and supervise the resources is SEEI as a school/faculty. The Dean of SEEI is assisted by Vice Dean for Academic Affairs (WDA) and Vice Dean for Resources (WDS) to run all of its programs using all of its resources, including the EPE Program. Based on the input from the academic community of the school, the EPE Program chair is proposed by the Dean and then appointed formally by the decree of the Rector. The EPE Program chair works under the coordination of the Vice Dean for Academic Affairs (WDA).

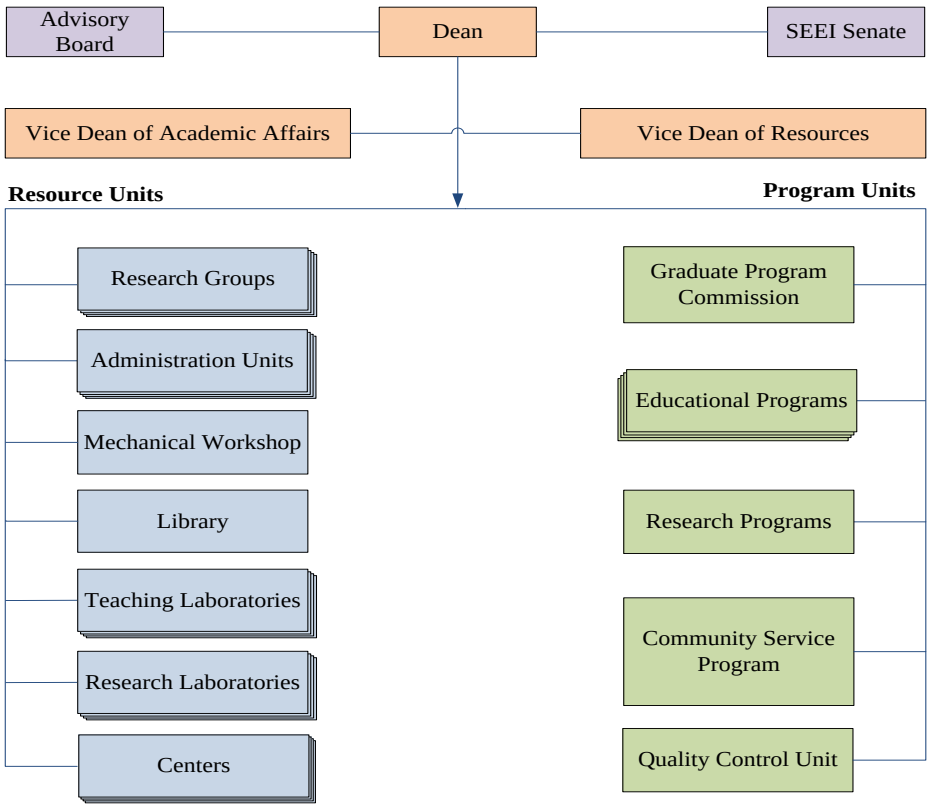


Fig. 8.1 SEEI Organization Diagram

The authority and responsibility of the EPE Program chair include the implementation and evaluation of the entire process in academic activities related to student services, such as deliveries of lectures, laboratory works, industrial co-op, as well as student activities using the available resources both in SEEI and ITB and also fostering relationships with government agencies and industry. In managing the program, the EPE Program chair coordinates resource utilization with related resource unit managers (see Fig.8.1). However, the EPE Program may seek other financial sponsor for

some activities such as the biannual EPE excursion where students go to companies where they can see the real-life practical technology they study in class theoretically i.e. excursion to PLTA (hydro power plant) for better understanding in EP3070 (Electric Power Plant) or excursions to substations examining the existing layout to design better protection systems based on knowledge attained from EP3076 (Power System Protection).

For example, faculty assignment for teaching is made by coordination with the Heads of Research Groups within SEEI. The EPE Program chair proposes faculty assignment each semester to the Heads of Research Groups through the WDA. Meeting at the level of the Research Group (RG) is held to determine faculty assignment which balance the burden of tuition, research, community service, and management tasks of every faculty member belongs to the RG. Results of the RG meeting are brought to the SEEI meeting attended by Dean of SEEI, all educational programs' chairs, Heads of RGs, and Heads of Laboratories to be discussed and then decided by the Dean of SEEI.

Meanwhile, the laboratory works are implemented through the coordination with the lecturer of the course and the head of relevant laboratory. The administration of the EPE Program is supported by the school with officers assigned to serve the EPE Program. The administrative unit comprises Academic, Finance, Facilities and Infrastructure, Information Systems, and Human Resources sub-sections. In addition, the EPE Program chair is assisted by EPE Program teams that consists of Curriculum Committee, Course & Laboratory Assistant Team, Capstone Design Team, Co-op/Internship Team, Information System Team, and Student Affairs and Alumni Team.

The courses in the EPE programs are run to follow the curriculum and the faculty staff, i.e. the lecturers, are required every semester to complete on-line self-evaluation form and simple course portfolio provided by ITB. The lectures of the course are also recorded by SEEI from which the records may be accessed by the EPE Program chair through ITB academic information system. Furthermore, students have the opportunity to evaluate the performance of lecturers through the ITB on-line questionnaire at the end of each semester. Based on the results of the questionnaire, the EPE Program chair has been able to respond for proposed improvements such as rotation of the lecturer of the course and administrative staff, redefining job description of the administrative staff, and improved course material or course delivery methods.

B. Program Budget and Financial Support

The financial sustainability of the educational program in ITB originates from budget of the ITB central office. In addition, the financial sustainability for the program is maintained by its strength to gain various financial supports from the competitive research grants, industries, alumni and international research fund. SEEI allocates the fund to achieve the academic excellent based on the fund allocated by ITB.

The planning and execution of the financial management are performed at level of SEEI. Every year, the school should gather the proposed budget needed by each laboratories and programs to run their activities in the forthcoming year. Each laboratory should propose adequate budget to maintain or upgrade their equipments and staffs. Each

program should propose adequate budget to run their activities especially teaching (class and laboratory) including financial support for teaching and laboratory assistants. Then, the school should negotiate with each programs and laboratories an acceptable budget planning and priorities for the imminent year.

The consolidated program and budget is submitted to the senate for evaluation. Final version of this document is called RKA. The RKA document is submitted to central office of ITB for approval. The approved version of RKA is used to run program and utilizes the financial support. Revision of RKA is possible in the mid-year. Additional budget may be added in the case that ITB gained significant additional revenue in the past 6 months.

The activities in the RKA are categorized into 2 groups. They are operational activities and transformation activities. The operational activities cover the education, research, society empowerment, institution development and academic supporting activities. Transformation (Program Pengembangan) activities consist of academic infrastructures and effectivity of organization. Maintenance of public facilities such as buildings, elevators, toilets is the responsibility of the Public Facilities Office and the budget is out of the school.

Besides this budget, each staffs and programs can get additional budget from other program from ITB and government agencies. ITB has some program for educational improvement and research.

The execution of the planned budget is carried out by the school/SEEI. The school manages all the expenses and incomes. Normally the SEEI should follow the RKA fixed for the associated year. However, for the urgent case, SEEI should be able to make minor adjustment to the plan.

Sources of Financial Support. A major part of the fund managed by the school comes from the ITB central office. The sources of this fund are the student enrollment and government budget. This is the budget managed by school through the RKA. This budget includes the salaries for all staffs of the school. The EPE program has also other annual financial source from the endowment fund from alumni that is managed by ITB central office.

Apart from this budget, ITB head office also allocates IDR 6 Billion competitive fund for funding ITB research programs. Each staff is eligible to acquire the fund. Successful staff may have a research grant of IDR 50 million annually. Traditionally, 30 % of the staff in the school gets this fund scheme.

Some government agencies have budget for research programs, educational improvement, and policies studies which can be accessed by SEEI and its staff. These agencies are Ministry of Research, Technology, and Higher Education; Ministry of Communication and Informatics; and Ministry of Defence of the Republic of Indonesia. Most of the staffs of the SEEI get fund from these research programs.

Support of Facilities and Equipment. The facilities and equipments are described in the criterion 7. The main budget for maintaining and furnishing the facilities come from

ITB central office through RKA (transformation activity part). A sum of IDR 212.483.000,- is allocated from RKA 2017 for maintenance and operational costs of facilities and equipments. In addition, ITB head office also allocates IDR 1.998.281.144,- for procurement of laboratory facilities. The other sources of fund to improve the facility come from the Ministry of Research, Technology, and Higher Education and alumni.

Table 8.1 Budget Allocation for Facilities and Equipment in SEEI (in IDR)

Budget Item	2015	2016	2017
Building Maitenance	362,145,061	664,099,000	481,821,256
Equipments Maintenance	254,553,000	239,202,000	212,483,000
New Procurement	2,164,258,140	1,656,933,900	1,998,281,144
Consumables	1,827,614,895	1,438,843,750	1,755,588,500

In order to strengthen academic atmosphere in the school, some excellent centers have been established in the School of Electrical Engineering and Informatics. The centers are:

(1) Center for Wireless Communications. This center was established in 2005 in cooperation with Aalborg University of Denmark, TU Delft of the Netherland, and Asian Birla Institute of Technology India

(2) Microsoft Innovation Center (MIC) (established in 2006) in cooperation with Microsoft Indonesia

(3) Java Competence Center (JCC) (established in 2004) in cooperation with Sun Microsystems

(4) International Research Center for Telecommunications and Radars (IRCTR) (established in 2006) in cooperation with TU Delft

(5) Open Source Center (OSC) (established in 2007)

(6) Mobile Broadband Technology Center (MBTC) (established in 2007) in cooperation with Qualcomm and Bakri Telecom

(7) ITB-KOREA Cyber Security Research and Development Center (CSC) (established in 2016 in cooperation with Korea International Cooperation Agency (KOICA)

(8) Micro Electronics Center (ME)

(9) LanGrid Bandung Operation Center

(10) Center for Telematics, Radio Telecommunications & Microwave

(11) Media Innovation Centre

(12) BlackBerry Innovation Center ITB

ITB has a very good support units/directorate. The scheduling of classrooms is the responsibility of the university registrar. Moreover, the university facility and infrastructure directorate is responsible for all maintenance issues related to offices, laboratories, and classrooms other than computer or projector related issues. The computer or projector maintenance issues are the responsibility of the SEEI IT personnel and/or the USDI. Procurement of equipment used for offices, labs and research are the responsibility of the Logistic Unit. Thus, the support of facilities and equipment is adequate to achieve program's outcomes.

Adequacy of Budget. For these last several years, the SEEI has adequate budget to run all of the educational program activities. The fund from ITB central office is adequate for operational cost of teaching, laboratories and other educational activities. Normally, SEEI will not have problem to have adequate budget for operational and maintenance cost and for attaining the EPE Program's student outcomes.

The school also gets some other fund from ITB and other sources for improvement of the facilities and teaching. The sources and allocations of bugdet in the year 2013 – 2015 are depicted in next table.

Table 8.2 SEEI Source of Budget

Sources	Amount (rupiahs)		
	2014	2015	2016
(1)	(3)	(4)	(5)
ITB	6,290,716,135	5,866,676,135	9,585,913,438
Ministry of Research, Technology, and Higher Education	6,889,469,600	11,096,866,939	15,208,934,629
Other	14,394,676,475	20,044,298,700	14,801,358,147
Total	27,574,862,210	37,007,841,774	39,596,206,214

The allocation of this bugdet is depicted in the table below:

Table 8.3 SEEI Budget Allocation

No.	Allocation	Amount (rupiahs)		
		2014	2015	2016
(1)	(2)	(3)	(4)	(5)
1	Education	13,245,175,610	14,604,869,033	11,785,358,977
2	Research	7,820,974,000	16,246,603,627	20,703,948,321

3	Society	329,339,000	597,433,000	108,565,534
4	Other	5,979,173,600	5,758,934,253	6,996,333,382
	Total	27,374,662,210	37,207,839,913	39,594,206,214

Furthermore, the SEEI and faculty rely heavily on the excellent resources and support facilities provided by the university. These include:

1. The Information Resources Unit (USDI). Directorate
2. The Logistic Directorate
3. The Facility and Infrastructure Directorate
4. The Central Library.
5. UPT Bahasa
6. UPT Olahraga
7. UPT K3L

The role of USDI in supporting the SEEI have been explained in Criterion 7. The SEEI relies on the university network/computing services (USDI) for support on computing and networking facilities. The role of both the logistic unit and the facility and infrastructure directorate in supporting the SEEI have also been described therein.

With respect to the central library, it is considered as a science and engineering library. Nearly 78% of its collection is related to the fields of science and engineering. The collection includes books, periodicals, proceedings, theses, reports, and electronic resources. The library has acquired a good number of electronic databases and Internet resources, and has established searching mechanisms for such databases. Faculty and students have Intranet and Internet remote access to almost all the databases using the library's URL http://www.lib.itb.ac.id/.

C. Staffing

The staff is support personnel in the unit of placement such as Administration, Laboratory, Financial Administration, Academic Administration, Secretariat, Human Resources Administration, or Facilities and Infrastructure unit. The staff's performance evaluation is conducted by his/her immediate supervisor in the placement unit. The following Table 8.4 shows the distribution of support personnel and institutional services. SEEI have enough support personnel to help faculties running SEEI's programs.

The SEEI has dedicated staff and technicians to supervise the tasks of running, maintaining, and upgrading the various teaching and research laboratories at the school. Accordingly, the aforementioned personnel resources are adequate to service the EPE Program.

Table 8.4 Support Personnel

No.	Job	Number of Staff
1	Librarian	9
2	Technician/ Analyst/ Operator/ Programmer	14
3	Administration staff	35
4	Other	13
Total		71

Similar to the faculty, the staff have health insurance benefit from ITB for their family with maximum two children on top to the standard health insurance as civil servants. The staff also enjoy larger partial support of tuition fees if their children are ITB students. Furthermore, SEEI gives more incentives if they are involved in more SEEI's activities and events. The staff and their family may also join the annual social/recreational outing or gathering with faculties and their family with financial support as well.

Meanwhile, to develop staff's competence and to support promotion, SEEI regularly sends the staff to attend training such as safety and firefighting training and information technology training held by Human and Organizational Development (PMO) office of ITB.

D. Faculty Hiring and Retention

Currently, in accordance with the policy of ITB Board of Trustees (BoT), ITB only recruits faculties with PhD qualifications or at least will graduate in the near future from a Doctoral Program. ITB is a state university and hence almost all faculties are civil servants (PNS) under the Ministry of Research, Technology, and Higher Education. The faculties are mostly recruited through the selection process conducted in accordance with the national open recruitment procedure for civil servants. The selection process includes national written examination.

In principle, the EPE Program cannot do the recruitment of new faculty and hence relies it on SEEI. If there is a need of new faculty, the EPE Program chair may propose it to SEEI level. Basic considerations used in the recruitment of the faculties is the education background, work experience, potential to grow, interest in education and research, attitudes, and interpersonal skills. The same procedure applies to Research Groups, Laboratory, or other SEEI Programs that need to have new faculty. In SEEI, all proposed new faculties are then discussed and assessed with the concerned parties before a priority list is finalized in SEEI level. Next, SEEI submit the proposed list to ITB. However, the number of new faculties that will be recruited by SEEI is determined by ITB based on certain criteria and policy. It should be noted that a quota of new faculties as civil servant also applies to ITB under the policy of the Ministry of Research, Technology, and Higher Education.

SEEI may also hire limited number of academic and/or research assistants who are placed in research groups. Although they are contract employees of and paid by SEEI, they are recognised by ITB. Each research group may submit the candidate of the academic or research assistants to SEEI. The candidates are often already involved in a research group and of excellent qualification. Subject to the relevance to SEEI programs, priority policy and budget, SEEI decides the successful candidates and then submit to ITB for the Rector issuing a decree of formal recognition.

ITB and SEEI have been able to retain its qualified faculties in many ways. As Indonesia civil servants, faculties in SEEI have the the same base salary that depends on education qualification and years of service. However, being in a state university ITB, other part of their income is based on academic rank, lecturer certification, and performance, which also depend on years of service. In addition to an academic rank allowance, it should be noted that the allowance for having an academic rank of full professor or for having national lecturer certification is as big as the base salary.

Furthermore, both ITB and SEEI provides various incentive schemes. On the ITB/university level, the incentive shcemes are academic publication incentive based on type and impact of the publication and teaching overload incentive. ITB also offers some benefits, i.e. additional private health insurance for the faculty and family of two children (aside from the standard health insurance as civil servants) and recently a partial support for the tuition fees for children as ITB students.

Meanwhile, on the SEEI level, the incentive schemes are full/part financial support for attending conferences, professional society memberships (IEEE & ACM), teaching overload incentive, and involvement incentive in any SEEI's activities/committees. SEEI also provides desktop and laptop for faculties to support their works and opportunity for attending personal development training, such as pre-training for professional engineer and training as auditor/assessor for professional certification. Moreover, SEEI facilitates access to competitive research schemes and professional consultancies and also supports applications to the research funds. In social activity, each year SEEI has managed to hold recreational outing or social familiy gathering in many places of interest in Indonesia for faculties and their families with partial financial support.

E. Support of Faculty Professional Development

There are various scheme of support for faculty development, i.e. formal education, research fund, and support for professional activity such as professional organization and conferences.

For example, in the fiscal year of 2015 IDR 175 M is allocated to support the staff development. Each staff is eligible to use the fund at most 2 international events and 2 national events. For attending international events, staff and students are also eligible to get partial support from ITB head office. In this case, IDR 900 M has been allocated to support these programs.

The faculty professional development is managed through the research group. The academic atmosphere is also strengthened along with the establishment of research groups in the School of Electrical Engineering and Informatics. The research groups are:

(1) Power Engineering Research Group chaired by Prof. Dr. Suwarno

(2) Telecommunication Research Group chaired by Prof. Dr. Adit Kurniawan

(3) Control and Computer Systems Research Group chaired by Prof. Dr. Carmadi Machbub

(4) Computer Research Group chaired by Prof. Dr. Kuspriyanto

(5) Electronics Research Group chaired by Prof. Dr. Adang Suwandi Achmad

(6) Biomedical Engineering Research Group chaired by Prof. Dr.Tati Latifah R.

(7) Informatics Research Group chaired by Prof. Dr. Iping Supriana

(8) Information Technology Research Group chaired by Prof. Dr. Suhono H Supangkat

(9) Software Engineering and Data Research Group chaired by Prof. Dr. Benhard Sitohang

Faculty members were also encouraged to attend international conferences overseas and publish their research in qualified journals. More than 20 faculty members attended international events annually. The SEEI is also actively engaging cooperation with international institution to make joint researches, education programs as well as faculty and student exchanges. This cooperation brought a significant additional funding for local/international travel for faculties as well as students, for upgrading research facilities and for holding international academic events such as seminars, workshops and conferences.

To bolster the international cooperation and introduce the students into international academic event. The departement encourages and offering financial suppour to its staff to join international events such as seminars and conferences and to bring the international events to Indonesia. Financial incentives are also offered by the university to the faculty paper publications according to the type and the impact of the publications. In addition, the school also cover membership annual fee for each faculty for international professional association such as IEEE and ACM.

PROGRAM CRITERIA

Breadth and Depth

Table 5.6 shows the EPE core that consists of fourteen required courses with total of 36 (thirty six) credit hours. This courses offer fundamental introductory knowledge and solid background in all electrical engineering area, especially power engineering areas. The core courses are designed to sharpen the engineering ability of EPE students by providing fundamental courses of engineering such as electric circuits and electromagnetics. The students, after successfully completing these courses should have the ability to broaden their knowledge by taking Breadth courses and then have the ability to either focus on one or more areas, or to select their Depth courses from different areas according to their plans or interests.
The EPE program acknowledges that the EPE field is a broad area of knowledge. The EPE program requires students to take all 8 (eight) courses with total of 21 (twenty one) credit hours. The breadth courses prepare the student for a broad knowledge in the field of electrical power engineering. Table 5.7 presents the list of the EPE Breadth courses.
The Electrical Power Engineering Depth component comprises of 31 (thirty-one) credit hours that student have to take, 18 (eighteen) credit hours are mandatory, while the rest are obtained from electives. The electives are open to the students depend on their interest in power engineering areas. The depth courses also serve to equip students with depth knowledge necessary for graduate study. Table 5.8 shows the power engineering depth courses.

Engineering analysis and design contents are covered in the curriculum starting from the First Year stage through the introductory courses, i.e. KU1101/KU1102 Introduction to Engineering and Design I/II. In the second year, the mandatory core courses EL2102 Digital Systems and microprocessing Lab and EL2205 Electronics Lab provide basic design content. In the third year, the breadth courses EP3070 Electric Power Plant and EP3076 Power System Protection include analysis and design content as one of the essential aspects of the courses. Later during the fourth year, student may opt to take the elective depth courses which emphasize engineering design aspect, such as EP4070 Electrical Power System Design, EP4071 Electric Energy Applications, EP4074 Systems Engineering, EP4077 Electric Power Distribution Systems, EP4079 Relay Protection

Probability and statistics. EP2091 course is one of the EPE compulsory courses. The course treats basic probability and statistics with an emphasis on engineering applications.

Differential and integral calculus. This topic is taught in two compulsory courses, i.e. MA1101 and MA1201. Students competence in calculus is assessed throughout the electrical engineering curriculum in the analysis and design of circuits and systems.

Additional Basic Science Requirement. The necessary background in physics is provided in the compulsory courses FI1101 and FI1201 that contains experimental

experience. Students' competence in physics is assessed primarily in the electronics and fields and waves portions of the electrical engineering curriculum. Additionally, students are obliged to take chemistry courses KI1102 and KI1202 to have a strong background in chemistry.

Advanced mathematics. Linear algebra is taught in the compulsory course MA2072 and further, along with linear differential equations, in MA2074. Numerical Analysis for Electrical Power is also taught in course EP3073.

Complex variables. Complex numbers and phasors are taught in EL1200, and Fourier and Laplace transforms are taught in EL2001 and EP2094. This material is used throughout the EPE curriculum.

APPENDIX A – COURSE SYLLABY

MA1101 - Mathematics I A

1. Course number and name: MA1101Mathematics I A

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Novriana Sumarti

4. Text books:
    a. Purcell, D., Purcell, E.J., Rigdon, S.E., 2007, Calculus, 9th ed. Pearson Prentice Hall
    b. Stewart, J., 2015, Calculus, 8th ed, Brooks/Cole Publishing Company
    c. Thomas, G. B., Weir, M. D., Hass, J., 2014, Calculus 13rd edition, Pearson

5. Specific course information
    a. brief description of the content of the course (catalog description):
       This course provides the first part of university calculus concepts, with emphasis on the mathematical skills needed for further studies in science and engineering fields.
       The topics consist of number systems, inequalities, functions and limits, differentiations and its applications, integrals and its applications, transcendental functions.
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
       Students will be able to utilize mathematical principles to describe simple natural phenomena and engineering problems
       Students will be able to apply mathematical techniques to solve simple science and engineering problems
    b. student outcomes addressed by the course: a,e

7. Brief list of topics to be covered
    a. Real number system
    b. Inequalities
    c. Functions and limits
    d. Derivatives and its applications
    e. Integrals and its applications
    f. Transcendental functions

FI1101 - Elementary Physics IA

1. Course number and name: FI1101 Elementary Physics IA

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Nurhasan

4. Text books:
    a. Halliday, D., Rosnick, R., and Walker, J., 2014, Fundamental of Physics, 10th ed. John Wiley and Sons, Asia
    b. Serway, R.A. 2013, Physics for Scientists and Engineers, 9th ed. Brooks Cole

5. Specific course information
    a. brief description of the content of the course (catalog description):
       This course explains the physics of various physical phenomena related to the concepts of kinematics; relative motions; dynamics of point objects; rotational motions; elasticity and oscillations; wave mechanics; fluid statics and dynamics, thermo-physics
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
        - Students will be able to apply the concepts of physics to explain simple natural phenomena and engineering problems
        - Students will be able to conduct simple physics experiment in compliance to equipment operational procedures, material handling procedures and safety requirements
        - Students will be able to solve simple problems related to natural phenomena and engineering problems
    b. student outcomes addressed by the course: a,b,e

7. Brief list of topics to be covered
    a. Kinematics of point objects
    b. Relative motion
    c. Dynamics of point object
    d. Dynamic system of point objects
    e. Rotational motion
    f. Elasticity and oscillation
    g. Wave mechanics
    h. Fluid static and dynamic
    i. Thermo-physics

KI1102 - General Chemistry IB

1. Course number and name: KI1102 General Chemistry IB

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Bambang Prijamboedi

4. Text books:
    a. Brady, J.E. and Senese, F., 2008, Chemistry:Matter and Its Changes, 5th ed., John Wiley & Sons
    b. Chang. R., 2015, Chemistry, 12th ed., Mc Graw-Hill Education

5. Specific course information
    a. brief description of the content of the course (catalog description):
       This course introduces essential concepts of chemistry, e.g. atoms, elements and compounds; concepts of mole and stoichiometry; reaction in aqueous solution; oxidation-reduction reactions; energy and chemical reaction; thermodynamics; theory of atoms based on quantum mechanics; chemical bonding; molecular structure; properties of gases; intermolecular force and properties of liquids and solids.
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
       Students will be able to apply the concepts of chemistry to explain the daily phenomena related to the aforementioned subjects in various conditions
    b. student outcomes addressed by the course: a

7. Brief list of topics to be covered
    a. Stochiometry
    b. Chemical Energy
    c. Atomic Structures
    d. Molecular Structure
    e. Periodic Table
    f. Data on Substance
    g. Chemical Equilibrium

KU1101 - Introduction to Engineering Design I

1. Course number and name: KU1101 Introduction to Engineering Design I

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Taufiq Mulyanto

4. Text books:
    a. Kosky, P. *etal*., 2015, Exploring Engineering: An Introduction to Engineering and Design, 4th ed., Academic Press
    b. Moaveni, S., 2011, Engineering Fundamentals: An Introduction to Engineering, Cengage Learning

5. Specific course information
    a. brief description of the content of the course (catalog description):
    This course introduces students to the aspects of engineering and design in society, engineer as a profession, ethics in engineering, key elements of engineering analysis, the concepts of energy conversion and conservation, some examples of engineering disciplines and procedures in engineering designs.
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
    Students will be able to explain the role of engineers in society, the required scientific and engineering basis to communicate in a multidisciplinary environment, and to apply simple engineering design procedures.
    b. student outcomes addressed by the course: a, c, e, f

7. Brief list of topics to be covered
    a. Engineering and design in society
    b. Engineer as a profession
    c. Engineering ethics
    d. Key elements of engineering analysis
    e. Concept of energy, conversion and conservation
    f. Examples of engineering disciplines
    g. Engineering design procedures

KU1072 - Introduction to Information Technology B

1. Course number and name: KU1072 Introduction to Information Technology B

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Fazat Nur Azizah

4. Text books:
    a. Beekman and Quinn, 2012, Digital Planet: Tomorrow's Techology and You, 10th ed., Prentice Hall
    b. Williams, K., and Sawyer, S.C., 2011, Using Information Technology: A Practical Introduction to Computers and Communications, 9th ed, Mc Graw Hill
    c. Morley and Parker, C.S., 2013, Understanding Computers: Today and Tomorrow, 14th ed, Course Technology

5. Specific course information
    a. brief description of the content of the course (catalog description):
    This course introduces information technology as a part of ethical development of creativity. The course materials include the introduction to computer system and organization (hardware and software), communication network (including the internet), the implications of the use of information technology in the aspects of human's life (especially the ones related to the life in the faculty/school), as well as computational thinking through the basics of procedural programming in a chosen programming language.
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
        - Describe fundamentals of computer and information technology
        - Utilize information technology and computers, as well as some commercial application program
        - Utilize information technology and computers in an academic community
    b. student outcomes addressed by the course: a, e

7. Brief list of topics to be covered
    a. Overviews of Computer and Network System
    b. Application of System Informations
    c. Data flow diagram and Algorithm
    d. Programming: Types, Cases, Loop, Subprograms, Arrays & Matrices

KU102X English

1. Course number and name: KU102X English

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Untari Gunta Pertiwi, M.Pd.

4. Text books:

   a. Jeffries.*etal*., 1996, Reading Power, New York: Addison Wesley Publishing Company
   b. Spargo, E.,1989,Timed Reading, USA: Jamestown Publishers
   c. Axelrod, R. and Cooper, 2013, Reading Critically, Writing Well, 10th ed., Bedford/St. Martin's
   d. Amaudet, M.L. and Barret, M.E., 1984, Approaches to Academic Reading and Writing. Prentice Hall: Englewood Cliff, NJ.
   e. Bartram, M and Perry, A., 1989, Reading Skills, Penguin Books, Great Britain
   f. Blake, K.A., 1989, College Reading Skills, Prentice Hall, New Jersey
   g. Floris, F.D, *etal*., 2007, Success in Academic English: English for General Academic Purpose, Graha Ilmu, Jakarta.
   h. Folse,K.S., 2001 Great Paragraph, Houghton Mifflin Company, USA
   i. Bander, R., 1981. From Sentence to Paragraph, CBS College Publishing, Canada
   j. English, K.A., 2004. Northstar: Reading and Writing, Longman, New York
   k. Frank, M. 1972, Sentences and Complex Sentences, Prentice Hall, New Jersey
   l. Oshima, A. and Ann Hague, 1999, Writing Academic English, Longman, New York
   m. KK Ilmu Kemanusiaan, FSRD-ITB, 2013, Academic Writing, Penerbit ITB, Bandung
   n. Strauch, O.A., 2005, Writers at Work: The Short Composition, Cambridge University Press, Cambridge:
   o. Williams, A., 2011, Writing for IELTS, Harper Collins, London
   p. Wingersky, J. *et. al*., 1995, Writing Paragraphs and Essays, Wardsworth Publishing Company, California
   q. Zemach, E.D., 2008, Writers at Work: The Essay, Cambridge University Press, Cambridge
   r. Goodale, M., 2006, Professional Presentations: A video-based course, Cambridge University Press.
   s. KK Ilmu Kemanusiaan, FSRD-ITB, 2013, Academic Writing, Penerbit ITB,Bandung

t. Meriwether, N.W., 2000, Successful Research Paper in 12 Easy Steps, McGraw-Hill.
u. Oshima, A., 2000, Writing Academic English. Longman.
v. Powell, M., 2002, Presenting in English: How to give successful presentations, Thomson Heinle.
w. Williams, E.J., 2008, Presentations in English, Macmillan.

5. Specific course information
   a. brief description of the content of the course (catalog description):
      This course provides the methods for reading comprehension, academic writing and presentation in English for academic purposes.
   b. prerequisites or co-requisites: -
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      Students will be able to resume important ideas of English academic and scientific texts, able to write a 2000-word English argumentative essay and able to present scientific arguments in English.
   b. student outcomes addressed by the course: e, g

7. Brief list of topics to be covered
   a. Reading comprehension: previewing, guessing word meaning, identifying paragraph main and supporting ideas, annotating and outlining, analyzing an argument, writing summary and analysis
   b. Writing: General description of writing, types of sentences, paragraphs, unity, coherence, writing an essay, patterns of essay organization
   c. Presentation: Parts of presentation, presentation opening, linking ideas, body language, designing and using visual aids, presentation ending

KU1001 Sports

1. Course number and name: KU1001 Sports

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Kusnaedi

4. Text books:
   a. Bompa, T.O., 1994, Theory and Methodology of Training, Iowa: Kendal/Hunt Publishing Company
   b. Goleman, D., 1977, Emotional Intellegence, Jakarta: PT. Gramedia.Pustaka (Indonesian version)
   c. Giriwijoyo, S.Y.S, 2005, Manusia dan Olahraga, ITB - FPOK UPI Bandung, Penerbit ITB.
   d. Harsono, 1988, Coaching dan Aspek-asapek Psikologis dalam Coaching, CV. Tambak Kusuma.Pustaka
   e. Snow H., 1992, The Power of Team Building, San Diego, California: Pfeiffer & Company
   f. Willmore, J.H. and Costill, D.L., 1999, Physiology of Sport and Health Exercise

5. Specific course information
   a. brief description of the content of the course (catalog description):
      - This course prepares the students to apply principles of health, fitness, sports and nutrition, to maintain and improve their physical and mental performances.
      - This course also provide opportunities for teamwork and character building through sports games that requires motivation, spirit, discipline and fairness, as well as to improve degree of physical fitness
   b. prerequisites or co-requisites: -
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      Students will be able to maintain and increase their stamina and to achieve the positive values of sport, and to apply the principles in life on campus and the society
   b. student outcomes addressed by the course: d

7. Brief list of topics to be covered
    a. Physical & Mental Health
    b. Nutrition
    c. Sports Training Principles
    d. Physical Endurances, Flexibility and Agility

MA1201 Mathematics IIA

1. Course number and name: MA1201 Mathematics IIA

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Novriana Sumarti

4. Text books:
    a. Purcell, D., Purcell, E.J., Rigdon, S.E., 2007, Calculus, 9th ed. Pearson Prentice Hall
    b. Stewart, J., 2015, Calculus, 8th ed, Brooks/Cole Publishing Company
    c. Thomas, G.B., Weir, M.D., Hass, J., 2014, Calculus 13rd edition, Pearson

5. Specific course information
    a. brief description of the content of the course (catalog description):
    This course covers the second part of university calculus concepts, with emphasis on the mathematical skills needed for further studies in science and engineering fields.
    The topics include techniques of integration, indefinite forms, improper integrals, infinite series, 2D and 3D geometries, derivatives in R^n, double integrals, ordinary differential equations
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
    Students will be able to utilize mathematical principles to describe simple natural phenomena and engineering problems
    Students will be able to apply mathematical techniques to solve simple science and engineering problems
    b. student outcomes addressed by the course: a,e

7. Brief list of topics to be covered
    a. Integration techniques: indefinite forms, improper integrals
    b. Infinite series
    c. 2D and 3D geometries
    d. Derivatives in R^n

e. Double integrals
f. Ordinary differential equations

FI1201 Elementary Physics IIA

1. Course number and name: FI1201 Elementary Physics IIA

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Nurhasan

4. Text books:
   a. Halliday, D., Rosnick, R., and Walker, J., 2014, Fundamental of Physics, 10th ed. John Wiley and Sons, Asia
   b. Serway, R.A., 2013, Physics for Scientists and Engineers, 9th ed. Brooks Cole

5. Specific course information
   a. brief description of the content of the course (catalog description):
      This course explains the physics of various physical phenomena related to the electrostatic (electric field, coulomb law), electric potential energy, electrical potential, capacitor, magnetostic, electromotive force, alternating current, electromagnetic wave, modern physics, atomic physics.
   b. prerequisites or co-requisites: -
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      - Students will be able to apply the concepts of physics to explain simple natural phenomena and engineering problems
      - Students will be able to conduct simple physics experiment in compliance to equipment operational procedures, material handling procedures and safety requirements
      - Students will be able to solve simple problems related to natural phenomena and engineering problems
   b. student outcomes addressed by the course: a,b,e

7. Brief list of topics to be covered
   a. Electrostatics: Coulomb's Law and Electric Field, Gauss' Law, Electric Potential, Capacitor and Dielectric
   b. Magnetostatics: Magnetic Field, Magnetic field by electric currents

c. Electromagnetic induction
d. Alternating current (AC)
e. Electromagnetic Waves
f. Interference & Diffraction
g. Modern Physics: Special Relativity Theory, Photons and Material Waves, Atomic Physics and Material Physics

KI1101 General Chemistry IIB

1. Course number and name: KI1101 General Chemistry IIB

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Bambang Prijamboedi

4. Text books:
   a. Brady, J.E., Jespersen, N.D., Hyslop, A., 2012, Chemistry, 6th ed, John Wiley & Sons
   b. Chang. R., 2015, Chemistry, 12th ed. Mc Graw-Hill Education

5. Specific course information
   a. brief description of the content of the course (catalog description):
      This course introduces essential concepts of chemistry, e.g. physical properties of solution, chemical equilibrium, molecular concept of acid and base, acid-base equilibrium, solubility and simultaneous equilibria, electrochemistry, nuclear chemistry
   b. prerequisites or co-requisites: -
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      Students will be able to apply the concepts of chemistry to explain the daily phenomena related to the aforementioned subjects in various conditions
   b. student outcomes addressed by the course: a

7. Brief list of topics to be covered
   a. Physical properties of solution
   b. Chemical equilibrium
   c. Molecular concept of acid and base
   d. Acid-base equilibria
   e. Solubility and simultaneous equilibria
   f. Electrochemistry
   g. Nuclearchemistry

h. Organic and biochemical chemistry

KU1201 Introduction to Engineering Design II

1. Course number and name: KU1201 Introduction to Engineering Design II

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Taufiq Mulyanto

4. Text books:
   a. Kosky, P. *etal*., 2015, Exploring Engineering: An Introduction to Engineering and Design, 4th ed., Academic Press
   b. Moaveni, S., 2011, Engineering Fundamentals: An Introduction to Engineering, Cengage Learning

5. Specific course information
   a. brief description of the content of the course (catalog description):
      This course trains the students to apply the engineering design procedures in both small and large groups settings. The activities include class orientation and team preparation, student team activities in engineering designs: problem definition and formulation, propose alternative solution, conceptual design, experiment/ implementation of design solution, presentation and evaluation of design solution.
   b. prerequisites or co-requisites: -
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      Students will be able to apply the engineering design procedures in multidisciplinary team settings.
   b. student outcomes addressed by the course: a, c, e, f

7. Brief list of topics to be covered
   a. Class orientation and team preparation
   b. Engineering design procedures: problem definition and formulation, propose alternative solution and conceptual design,

experiment/implementation of design solution, evaluation of design solution

c. Hands-on teamwork in solving case studies in engineering design.

KU1011 Indonesian Languange: Scientific Writing

1. Course number and name: KU1011 Indonesian Languange: Scientific Writing

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Asep Wawan Jatnika

4. Text books:
    a. Hasan, A., *et.al*., 1998, Tata Bahasa Baku Bahasa Indonesia. Jakarta: Balai Pustaka.
    b. Depdikbud. RI., 2000, Kamus Umum Bahasa Indonesia Jakarta; Balai Pustaka.
    c. Keraf, G., 1998, Komposisi. Ende Flores: Nusa Indah
    d. Sosio Komunikasi, KK Ilmu Kemanusiaan, FSRD-ITB 2006 Metode Penulisan Ipteks. Bandung Penerbit ITB.
    e. Peraturan Menteri Pendidikan Nasional RI no. 46 tahun 2009. Pedoman Umum Bahasa Indonesia yang Disempurnakan
    f. Depdiknas RI. Keputusan Menteri Pendidikan Nasional no. 146/U/2004 tgl 12 Nov 2004.Pedoman Umum Pembentukan Istilah.

5. Specific course information
    a. brief description of the content of the course (catalog description):
       This course explains the about spelling, word formation, grammar, logic, definition, construction, paragraph construction, paper writing conventions and scientific writing organization.
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
       Students will be able to express ideas and findings in the form of academic and scientific works by using the proper Indonesian grammar
    b. student outcomes addressed by the course: d, g

7. Brief list of topics to be covered
    a. Spelling
    b. Word formation
    c. Grammar and logic
    d. Definition and construction
    e. Paragraph construction
    f. Paper writing conventions
    g. Paraphrasing
    h. Scientific writing organization.

EL1200 Introduction to Circuit Analysis

1. Course number and name: EL1200 Introduction to Circuit Analysis

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Eniman Yunus Syamsuddin

4. Text books:
    a. C.K. Alexander & M.N.O. Sadiku, Fundamentals of Electric Circuits, Mc Graw Hill, Fifth Edition, 2013
    b. R.C. Dorf & J. A. Svoboda, Introduction to Electric Circuits, John Wiley & Sons, Sixth Edition, 2004

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Basic concepts, basic laws, methods of analysis, circuit theorems, operational amplifier, capacitors and inductors, first-order circuits, second-order circuits, sinusoidal circuits: phasors, circuit modelling, and steady state analysis of the 1st and 2nd order circuits.
    b. prerequisites or co-requisites:
        - FI1101 Basic Physics IA (prerequisites)
        - MA1101 Mathematics IA (prerequisites)
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction: At the end of this subject, students should be able to:
        1) Understand the fundamental concepts of charge, current, voltage, power, energy, and circuit elements.
        2) Apply basic laws (Ohm & Kirchhoff) for analysis resistive networks using nodal and mesh analysis.
        3) Analyze resistive networks and simplify complicated networks using various circuit theorems (superposition, source transformation, Thevenin & Norton, maximum power transfer).
        4) Analysis and design simple networks containing operational amplifier.
        5) Deal with circuit containing energy storage elements.
        6) Determine transient and steady state response of the first and second order circuits.
        7) Perform 1st & 2nd order sinusoidal circuits modelling
        8) Determine steady state analysis of 1st and 2nd order sinusoidal circuits
        9) Use SPICE to analyst DC and AC circuits.
        10) Use Matlab as a tool to solve the network problems.
    b. student outcomes addressed by the course: a,e

7. Brief list of topics to be covered:
    a. Importance of Electric Circuits in Engineering World. Basic Concept
    b. Basic Laws
    c. Methods of Analysis
    d. Circuits Theorems
    e. Operational Amplifiers
    f. Capacitors and Inductors
    g. First-Order Circuits
    h. Second-Order Circuits
    i. Sinusoids and Phasors

IF1210 Programming Fundamentals

1. Course number and name: IF1210 Programming Fundamentals

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: -

4. Text books:
   a. Inggriani : "Diktat Kuliah Dasar Pemrograman (Bagian Pemrograman Prosedural)", Kelompok Keahlian Rekayasa Perangkat Lunak dan Data, Edisi April 2007.
   b. Inggriani Liem, "Diktat Kuliah Dasar Pemrograman, Bagian Pemrograman Fungsional", KK Rekayasa Perangkat Lunak dan Data, STEI, ITB, Februari 2008.
   c. Abelson H, Sussman G & Sussman J: "Structured and Interpretation of Computer Programs", 2nd edi, MIT press. Available at http://mitpress.mit.edu/sicp
   d. Selected relevan internet references:
      1) The Beauty and Joy of Computing. http://inst.eecs.berkeley.edu/~cs10/sp13
      2) Exploring Computational Thinking, http://www.google.com/edu/computational-thinking/index.html
      3) Introduction to EECS, http://mit.edu/6.01/handouts/readings.pdf
   e. Sri Purwanti, "Diktat LISP", Departemen Teknik Informatika, ITB, 2006-2007. (pendukung)
   f. Inggriani : "Contoh Program Kecil dalam Bahasa Pascal", Program Studi Teknik Informatika ITB, STEI-ITB, Edisi April 2007. (secondary)

5. Specific course information
   a. brief description of the content of the course (catalog description):
      This course offers the fundamental concepts of programming: abstraction, problem decomposition, modularization, recurrence; skill in small scale programming (coding aspects, through laboratory work); and overview of the big picture of programming and prepares the students to learn programming more deeply in the next stage
   b. prerequisites or co-requisites: -
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      - Students know and understand all the thinking , the terms, and tools used in solving problems through the creation of programs
      - Students know issues classes, programmer classes, and program classes

- Students know the techniques required in programming and practice on a small scale
- Students are able to encode simple small-scale programs and common issues
- Students become intrigued and interested to learn programming in more depth at a later stage

b. student outcomes addressed by the course: a, e

7. Brief list of topics to be covered
   a. Concepts and Programming Environment
   b. Abstract and functional thinking for problem solving
   c. Modular thinking, problem decomposition
   d. Modular thinking, decomposition module, and procedural Programming
   e. Small Project / case study
   f. Procedural Programming: Limitations and challenges in programming

EL2001 Electric Circuits

1. Course number and name: EL2001 Electric Circuits

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Eniman Yunus Syamsuddin

4. Text books:
    a. C.K. Alexander & M.N.O. Sadiku, Fundamentals of Electric Circuits, Mc Graw Hill, Fifth Edition, 2013 [Main]
    b. L. O. Chua, C. A. Desoer, and E. S. Kuh, **Linear and NonLinear Circuits,** McGraw-Hill International Editions, 1987.

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Sinusoidal steady-state analysis, AC power analysis, three-phase circuits, magnetically coupled-circuits, frequency response, Laplace transform and its application to circuit analysis, Fourrier series, Fourrier Transform, two-port networks.
    b. prerequisites or co-requisites:
        - EL1200 Introduction to Circuit Analysis (prerequisites)
        - EL2101 Electric Circuits Laboratory (co-requisites)
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
        - Apply phasor frequency domain analysis using various techniques.
        - Apply phasor concept to analyse AC power and three-phase circuits.
        - Deal with circuits containing magnetically coupled.
        - Draw Bode plot of transfer function and use frequency domain to analyse resonance and filter networks.
        - Apply Laplace transform to analyse DC and AC steady state networks.
        - Apply Fourier series and Fourier transformation to analyse the networks with non sinusoidal exitation.
        - Analyse 2-port networks using various parameters.
        - Use SPICE to analyst DC and AC circuits.
        - Use Matlab as a tool to solve the network problems.
    b. student outcomes addressed by the course: a,e,k

7. Brief list of topics to be covered
    a. Introduction to Circuit Analysis
    b. Sinusoidal Steady-state Analysis
    c. AC Power Analysis
    d. Three-phase Circuits
    e. Magnetically Coupled Circuits
    f. Frequency Response

g. Introduction to Laplace Transform
h. Applications of Laplace Transform
i. The Fourrier Series
j. The Fourrier Transform
k. Two-port Networks

EL2101 Electric Circuits Laboratory

1. Course number and name: EL2101Electric Circuits Laboratory

2. Credits and contact hours: 1 credits/contact hours

3. Instructor's or course coordinator's name: Muhammad Amin Sulthoni

4. Text books: -

5. Specific course information
    a. brief description of the content of the course (catalog description): Familiarization with lab instruments. Experiments with basic circuits containing resistors, capacitors, inductors, and op-amps. DC circuits and circuit theorems, circuits with opamps, transient phenomena, impedances, frequency response principles, resonance circuits.
    b. prerequisites or co-requisites: EL2001 Electric Circuits (prerequisites)
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
        - Use of laboratory instruments: multimeter, oscilloscope, function generator, regulated power supply.
        - Understand and compare circuit theorems with actual working circuits.
        - Understand how Thevenin, Norton, and Superposition Theorems, simplify circuit analyses.
        - Understand and design simple math functions with opamp circuits.
        - Understand and design an oscillator circuit using an opamps.
        - Understand and contrast the transient phenomena in electric circuits.
        - Learn about AC signals and the concept of phasor and impedance.
        - Observe and understand the behavior of RC and RL circuits as LPF and HPF and as integrator and differentiator.
        - Understand the Bode plot of a signal transfer ratio.
        - Design and understand RLC circuits, both parallel and series.
        - Learn how to write a proper lab report (both content and presentation).
    b. student outcomes addressed by the course: b

7. Brief list of topics to be covered
    a. Introduction
    b. Lab instruments: Multimeter, regulated power supply, and function generator
    c. Lab instruments: Oscilloscope
    d. DC Circuits and Circuit Theorems
    e. Circuits with Opamp

f. Transient Phenomena
g. AC and RC and RL circuits
h. Resonance circuits
i.

MA2072Engineering Mathematics I

1. Course number and name: MA2072 Engineering Mathematics I

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: -

4. Text books:
   a. Erwin Kreyzig, *Advanced Engineering Mathematics*, 10-th edition, John Wiley, 2011.

5. Specific course information
   a. brief description of the content of the course (catalog description):
      This course provides the basics of elementary algebra and calculus of variables. The orientation of this course is on the efficacy of the mathematical methods supported by concepts and reasoning. The first part of this course consists of a system of linear equations, matrices, determinants, vectors, vector spaces, inner product, linear transformations, eigenvalues and eigen vector. The second part of this course consists of function parameters, scalar field , derivative scalar fields , scalar fields , vector fields , divergence and rotation (curl) , integral folding , line integrals , surface integrals and related integral theorems.
   b. prerequisites or co-requisites:
      - MA1101 Mathematics IA (prerequisites)
      - MA1201 Mathematics IIA (prerequisites)
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      - Mastering technical skills supported by reasoning, concepts, formula , and the correct method
      - Developing the power of reason and creativity through various technical and problem-solving strategies .
      - Having sufficient knowledge base and mathematical thinking patterns to learn more mathematics independently .
   b. student outcomes addressed by the course: a, e

7. Brief list of topics to be covered
   a. Systems of Linear Equations
   b. Determinants and inverse
   c. Inner product space and Transformation
   d. Vector differential calculus

e. Vector Integral Calculus

EL2005 Electronics

1. Course number and name: EL2005 Electronics

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Elvayandri

4. Text books:
   a. A. Sedra and K. Smith, Microelectronic Circuits International 6th ed., Oxford University Press, 2011
   b. Thomas L Floyd, Electronic Devices 9th ed, Prentice Hall, 2011

5. Specific course information
   a. brief description of the content of the course (catalog description):
      Physics, operation, and models of diodes, BJT, MOSFET, and thyristors. Analysis and design of single-stage amplifiers: DC bias, small-signal properties, and frequency responses. Output Stage and Power Amplifier. CMOS logics.
   b. prerequisites or co-requisites:
      - EL2001 Electric Circuit (prerequisites)
      - EL2205 Electronics Laboratory
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      1) Draw the I-V characteristics of a PN junction diode, BJT, MOSFET, and thyristors
      2) Determine the different regions of operation of diode, BJT, and MOSFET.
      3) Draw the small-signal model for Diode, BJT and MOSFET.
      4) Determine the small-signal parameters of a small-signal model.
      5) Design the DC biasing for a single transistor amplifier.
      6) Analyze the small-signal properties (input and output impedance, and gain) of a single transistor amplifier.
      7) Analyze the frequency response of a single transistor amplifier.
      8) Apply thyristor for a simple power control.
      9) Analyze output stage of power amplifiers and its thermal properties.
      10) Analyze CMOS inverter performance and design of CMOS AOI logic gates
   b. student outcomes addressed by the course: a,e

7. Brief list of topics to be covered:
   a. History and overview
   b. Electronic properties of materials
   c. Diodes
   d. Thyristor
   e. Bipolar transistor
   f. MOS transistor

g. Frequency Response
h. MOS logic families
i. Design parameters and issues in CMOS Logics

EL2205 Electronics Laboratory

1. Course number and name: EL2205 Electronics Laboratory

2. Credits and contact hours:1 credits/contact hours

3. Instructor's or course coordinator's name: Mervin Tangguar Hutabarat

4. Text books: -

5. Specific course information
    a. brief description of the content of the course (catalog description):
    IV characteristization of the semiconductor devices. Diode circuits. Determination of DC bias. Single transistor amplifiers with BJT and MOSFET. Transistors as switches. Design and implementation of transistor amplifiers on PCB
    b. prerequisites or co-requisites:
    - EL2101 Electric Circuit Laboratory (prerequisites)
    - EL2005 Electronics(co-requisites)
    c. (required), (elective), or (selected elective): required

6. Specific goals for the course
    a. specific outcomes of instruction:
        1) Expand the mastery of use of the lab instruments, SPICE simulator, and PCB design tools.
        2) Produce plots of IV characteristics for Diode, BJT and MOSFET and point out what cause certain important parts of the plots.
        3) Sketch the output of halfwave and fullwave diode rectifiers with RC filters, shows the ripple effect of the RC filter and diode current.
        4) Sketch the voltage transfer characteristics of clipper and clamping circuits.
        5) Survey the bias of transistor and itseffect on small signal current amplification linearity.
        6) Measure, analyse and compare the input resistance, gain and output resitance of of the amplifier CE, CC, and CB for the BJT and CS, CD and CG for the MOSFET;
        7) Point out the limitation of BJT as current controlled switch and the advantages of CMOS inverter through the measurement results.
        8) Design and construct a transistor amplifier for a given specification.
        9) Produce PCB lay out and BOM for the group design.
        10) Test and evaluate the design and discuss the results and conclusion in the report.
    b. student outcomes addressed by the course: b
7. Brief list of topics to be covered
    a. Introduction
    b. Diodes
    c. BJT IV charaterization and Bias Point Selection
    d. Single BJT Amplifier Configurations

e. MOSFET IV Characteristic and Amplifier
f. BJT and MOSFET as Switches

EL2006 Electromagnetics

1. Course number and name: EL2006 Electromagnetics

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Suwarno

4. Text books:
   a. Willam H. Hayt, Jr., John A. Buck, Engineering Electromagnetics, 8th Edition, McGraw Hill, 2012 (Referensi Utama)
   b. Fawwaz T. Ulaby, Fundamentals of Applied Electromagnetics, 6th Edition, Prentice Hall, 2010
   c. Joseph A. Edminister, Electromagnetics, Schaum's outline of theory and problems, Second Ed., McGraw-Hill, 1995
   d. Mathew N.O. Sadiku, Elements of Electromagnetics, 5th Edition, Oxford University Press, 2009

5. Specific course information
   a. brief description of the content of the course (catalog description):
      History and Overview; Vector Analysis; Coulomb's Law, Electric Field Intensity; Electric Flux Density, Gauss's Law, Divergence; Energy, Potential, Gradient; Conductors, Dielectrics, Capacitance; Poisson's and Lapace's Equations; The steady magnetic field, curl; Magnetic Forces, materials, inductance; Time Varying Fields, Maxwell's Equations; Uniform Plane Wave, Plane Waves at boundaries and in dispersive media; Transmission lines; Waveguide and antenna fundamentals; Huygens-Freshnel Principle, spatial frequency, angular spectrum
   b. prerequisites or co-requisites:
      - FI1201 Physics II (prerequisites)
      - MA2072 Engineering Mathematics

   c.required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      1) Understand electrostatics and electrodynamics phenomenaUnderstand and apply Coulomb's Law, Gauss's Law, Poisson's and Lapace's Equations
      2) Understand magnetostatics and magnetodynamics phenomena
      3) Understand and apply Maxwell's Equations to palne wave in transmission line
      4) Understand wave guide and antenna fundamentals
      5) Understand Huygens-Freshnel Principle, spatial frequency, angular spectrum
   b. studentoutcomes addressed by the course: a,e

7. Brief list of topics to be covered:
   a. History and Overview; Vector Analysis

b. Coulomb's Law, Electric Field Intensity
c. Electric Flux Density, Gauss's Law, Divergence
d. Energy, Potential, Gradient
e. Conductors, Dielectrics, Capacitance
f. Poisson's and Lapace's Equations
g. The steady magnetics fields, curl
h. Magnetic Forces, materials, inductance
i. Time Varying Fields, Maxwell's Equations
j. Uniform Plane Wave
k. The Plane Waves at boundaries and in dispersive media
l. Transmission Lines
m. Waveguide and antenna fundamentals

MA2074 Engineering Mathematics II

1. Course number and name: MA2074 Engineering Mathematics II

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: -

4. Text books:
    a. Erwin Kreyzig, *Advanced Engineering Mathematics*, 10-th edition, John Wiley, 2011.

5. Specific course information
    a. brief description of the content of the course (catalog description):
    b. prerequisites or co-requisites:
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: a, e

7. Brief list of topics to be covered
    a. Complex function
    b. Complex integral
    c. Fourier series
    d. Partial differential equation

KU2071 Pancasila and Civic Education

1. Course number and name: KU2071 Pancasila and Civic Education

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Prima Rosa

4. Text books:
    a. TimNasionalDosenPendidikanKewarganegaraan,2010,PendidikanKewarganegaraan:ParadigmaTerbaruuntukMahasiswa,Alfabeta,Bandung.
    b. Ubaidillah and Razaq, A., 2012, Pancasila, Demokrasi, HAM dan Masyarakat Madani, Prenada Media Group, Jakarta
    c. Gaffar, A., 2000, Politik Indonesia: Transisi Menuju Demokrasi, Pustaka Pelajar Offset, Yogyakarta
    d. Kaelan, 2011, Pendidikan Kewarganegaraan untuk Mahasiswa, Pustaka Pelajar.Yogyakarta.
    e. Kaelan, 2013, Negara Kebangsaan Pancasila: Kultural, Historis, Filosofis, Yuridis, dan Aktualisasinya, Paradigma, Yogyakarta.

5. Specific course information
    a. brief description of the content of the course (catalog description):
       This course trains the student to integrate of nationalism, constitution, democracy, and civic values into the application of science, art and engineering in developing the nation.
    b. prerequisites or co-requisites: -
    c. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
       Students will be able to explain the concepts of society and states, to explain the values of Pancasila, to express their opinions about the sense of nationalism and passion to defend the country, to express their ideas about utilization of science and technology to improve the quality of life of the nation, to explain the history of the nation as a milestone to build civilization (science and technology), and to participate in evaluation, criticism, and control the government.
    b. student outcomes addressed by the course: f, h

7. Brief list of topics to be covered
    a. Pancasila as philosophy and the basis of Indonesian state
    b. National identity
    c. Politic and strategy
    d. The otonomy area
    e. The good governance
    f. The culture of democraty
    g. The civil society
    h. Supremation of laws

i. The declaration of Human Rights
j. Geopolitic and geostrategy

EL2142 Digital & Microprocessor Systems

1. Course number and name: EL2142Digital and MicroprocessorSystems

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Yusuf Kurniawan

4. Text books:
   a. S. Brown and Z. Vranesic: Fundamentals of Digital Logic and VHDL Design, 3rd Edition McGraw-Hill, 2009
   b. J.T. Ronald, S.W. Neal, G.L. Moss, Digital Systems Principles and Applications 10th edition, Pearson, 2007
   c. D. Gadre, Programming and Customizing the AVR Microcontroller, Mc Graw Hill, 2001

5. Specific course information
   a. brief description of the content of the course (catalog description):
      Fundamentals of digital logic and microprocessor system. Covers combinational and sequential logic circuits, programmable logic devices. Microprocessor system covers hardware, software, peripheral, interfacing and communication
   b. prerequisites or co-requisites:
      - EL1200 Introduction to Circuit Analysis (prerequisites)
      - EL3011 Computer System Architecture (co-requisites)
   c. required, elective, or selected elective: selected elective

6. Specific goals for the course
   a. specific outcomes of instruction:
      - Be able to represent and manipulate numbers in the binary two's complement number system, and convert numbers between different positional number systems. Be able to do negation and addition in the two's complement number system, and detect overflow.
      - Carry out transformations of Boolean algebra expressions, using the theorems of Boolean algebra and Karnaugh maps. The student can find the minimal sum-of-products (SOP) and product-of-sums (POS) expressions, and create a corresponding circuit from AND, OR, NAND, and NOR gates.
      - The student will be able to analyze the functional and electrical behavior of digital CMOS circuits, including noise margins, allowable fan-in/out, and power dissipation. Given an NMOS or CMOS circuit diagram, the student can determine its logic function, using switch models for the transistors. The student can map simple functions onto programmable logic devices manually.
      - The student can analyze and design digital systems of moderate complexity using contemporary technology methods, including programmable logic devices and CAD tools. The student can use standard combinational and sequential digital building blocks including adders, multiplexers, decoders, encoders, and registers.
      - The student can analyze and design microprocessor system, the student realize how to use stack, interrupt, address decoder, peripheral, interface and serial communication.

- The student can design and implement software for microprocessor, using super loop and foreground and background architecture
- The student will be able to write proper lab reports, communicating their objectives, approach, observations, and conclusions

b. student outcomes addressed by the course: a, b, e

7. Brief list of topics to be covered
   a. Introduction
   b. Boolean Algebra + Logic Circuit
   c. Implementation Technology
   d. Optimized Implementation of Logic Functions – KMAP
   e. Number Representation & Arithmetic Circuit
   f. Combinational Circuit Building Blocks
   g. Sequential Circuit Elements
   h. Synchronous State Machine
   i. Microprocessor System Architecture
   j. Stack and Interupt
   k. Address Decoder
   l. Software Architecture
   m. Peripheral
   n. Serial Communication
   o. Interfacing
   p. Microprocessor System Toolchain and Design

EP2092 Probability & Statistic

1. Course number and name: EP2092 Probability and Statistic

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Ngapuli Irmea Sinisuka

4. Text books:
    a. Dauglas C Montgomery, George C. Runger, Applied Statistics and Probability for Engineers, Fifth Edition, John Wiley and Sons, 2011, (main)
    b. R.E. Walpole and Myers, Probability and Statistics for Engineers and Scientists, Mac. Millan, (supporting)
    c. Ian F. Blake. An Introduction to Applied Probability , John Wiley and sons, 1987, (supporting)
5. Specific course information
    a. brief description of the content of the course (catalog description): Concept of probability, Random Variables, Discrete Probability Distributions, Continuous Probability Distributions, Functions of Random Variables, Statistics of Inference and Estimation Theory.prerequisites or co-requisites:
        - MA1101 Mathematics 1A (prerequisites)
        - MA1201 Mathematics 2A (prerequisites)
    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
    Solve general problems in engineering's world and general problem in Electrical Power Engineering using probability and statistic methods. Apply the theory of probability in discrite and continue include basic calculation and combination of practical distribution, meands and varians, sample statistic analysis, and central limit theorm.
    b. student outcomes addressed by the course: a,e

7. Brief list of topics to be covered
    a. Basic Probability Concept 1
    b. Basic Probability Concept 2
    c. Random Variables 1
    d. Random Variables 2
    e. Discrite Probability Distribution 1
    f. Discrite Probability Distribution 2
    g. Discrite Probability Distribution 3
    h. Continue Probability Distribution 1
    i. Continue Probability Distribution 2
    j. Continue Probability Distribution 3
    k. Random Variables Function 1
    l. Statistical Inference
    m. Estimation Theory 1
    n. Estimation Theory 2

EP2076 Measurement System

1. Course number and name: EP2076 Measurement System

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Syarif Hidayat

4. Text books:
    a. Alan S. Moris, Measurement and Instrumentation Principles, Third Edition, Butterworth-Heinemann, 2001(main)
    b. John Crisp, Introduction to Microprocessors And Microcontrollers, Newness, 2004 (supporting)
5. Specific course information
    a. brief description of the content of the course (catalog description):
    Introduction, Units, standard and calibration ; Errors in measurement ; Statistical methods in measurement data processing ; Basic components and characteristics of instrumentation system; Physical phenomenon, stimulus and sensors ; Electrical quantities ; Non-electrical quantities ; Signal conditioning; Data acquisition, processing and transmission ; Review of basic theory of microprocessor ; microprocessor based instrumentations. Concept of probability, Random Variables, Discrete Probability Distributions, Continuous Probability Distributions, Functions of Random Variables, Statistics of Inference and Estimation Theory. Prerequisites or co-requisites:
    • EL2001 Electric Circuit (prerequisites)
    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. specific outcomes of instruction:
    Understanding the basic concept of measurement system and microprocessor based instrumentation, and its applications in power systems and industries.
    b. student outcomes addressed by the course: a,b,c,d

7. Brief list of topics to be covered
    a. Introduction
    b. Basic Measurement Principal
    c. Basic Unit
    d. Fault in Measurement
    e. Data Processing
    f. Sensor System
    g. Electrical Measurement Unit
    h. Non-Electrical Measurement Unit
    i. Microprocessor and Microcontroller System Overview
    j. Microcontroller Application Measurement
    k. Microcontroller Application Project

EP2094 Signal & System

1. Course number and name: EP2094 Signal and System

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Deny Hamdani

4. Text books:
    a. Deny Hamdani, Sinyal dan Sistem, Penerbit ITB, 2012, (main)
    b. Deny Hamdani, Sinyal dan Sistem: Suplemen, Penerbit ITB, 2012, (main)
    c. H.P. Hsu, Signals and Systems: Schaum's Outline, McGraw-Hill, 1995, (main)
    d. A.V.W. Oppenheim, Signals and Systems, Prentice-Hall, 1997, (supporting)
    e. M.J. Roberts, Signals and Systems, 1997, (supporting)

5. Specific course information
    a. brief description of the content of the course (catalog description): Introduction to signal and systems, invariant linear-time systems, Laplace transformation, z transformation, continous-time Fourier analysis, discrete-time Fourier analyses, filtering, sampling, linear feedback systems
    Prerequisites or co-requisites:
    - MA2072 Engineering Mathematics I
    - EL2001 Electric Circuit (prerequisites)

    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: understanding on signal and systems with invariant linear time characteristics and their basic transformations, processing and applications
    b. student outcomes addressed by the course: a,e,k

7. Brief list of topics to be covered
    a. Signal
    b. System
    c. Linear Time-Invariant System
    d. Laplace Transform and CT LTI System
    e. Z-Transform and DT LTI System
    f. Fourier Signal Analysis and CT System
    g. Fourier Signal Analysis and DT System
    h. Filtering
    i. Sampling
    j. Linear Feedback System

EP3071 Electric Machines

1. Course number and name: EP3071 Electric Machines

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Agus Purwadi

4. Text books:
    a. S.J. Chapman, Electric Machinery Fundamentals. McGraw Hill Int. Ed.. 1991, (main)
    b. A.E. Fitzgerald,C.Kingsley Jr.,S.D. Umans; Eectric Machinery, McGraw-Hill, (main)
    c. Nagrath and Kothari, Electric Machines, Tata McGraw Hill, latest ed. (supporting)

5. Specific course information
    a. brief description of the content of the course (catalog description):
       This course dealt with performance and analysis of various electric machines and its applications. Starting with the electromagnetic circuits and transformers, the course then dealt with the of electro mechanic conversion concept. The DC motors and generators, the AC machines are discussed thoroughly in this course. Its also discussed the modern concept of electric machine types.
       Prerequisites or co-requisites:
       - EL2001 Electric Circuit (prerequisites)
       - EL2006 Electromagnetic Field (prerequisites)
    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: -
    b. student outcomes addressed by the course: a,e,k
7. Brief list of topics to be covered
    a. Introduction
    b. Magnetic Circuit
    c. Transformer
    d. Electro Mechanic Energy Conversion
    e. Direct Current Machines
    f. Three-Phase Winding
    g. Synchronous Generator
    h. Induction Machine
    i. Direct Current Motor as Mover
    j. Synchronous Motor as Mover

EP3073 Numerical Analysis for Power Engineering

1. Course number and name: EP3073 Numerical Analysis for Power Engineering

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Deny Hamdani

4. Text books:
   a. Deny Hamdani, Komputasi dan Analisa Numerik, Penerbit ITB, 2008, (main)
   b. E. Kreyzig, Advanced Engineering Mathematics, John Wiley & Sons, 1999, (main)

5. Specific course information
   a. brief description of the content of the course (catalog description): iterasi-fixed point, newton, secant, Interpolasi-lagrange, newton's, splines, Integration and differentiation rectangular, trapezoidal, simpson, gauss-seidel, Jacobi iteration, LU factorization-doolittle and crout, cholesky, ill-conditioning and norm, least squares, eigenvalue matrices-inclusion concepts, power methods, tridiagonalization-householder method, QR factorization, first order-euler, heun, runga-kutta, runga-kutta-fehlberg, higher order-euler, runga-kutta, partial differential-eliptic, parabolic, hyperbolic type
      Prerequisites or co-requisites:
      - MA2074 Mathematics Engineering II (prerequisites)
   b. required, elective, or selected elective: required

6. Specific goals for the course
   a. Specific outcomes of instruction: understanding on numerical analysis and its application for solving engineering problems. This course leads to capability of computation focused programming.
   b. student outcomes addressed by the course: a,e,k

7. Brief list of topics to be covered
   a. Introduction to numerical methods
   b. General numerical Methods: Solution of Non-linear equation
   c. General numerical Methods: Interpolations and integration
   d. Numerical methods for linear algebra : iteration
   e. Numerical methods for linear algebra : LU factorization
   f. Numerical methods for linear algebra : least squares, eigenvalue matrices
   g. Numerical methods for linear algebra : tridiagonalization
   h. Numerical methods for differential equations: first order
   i. Numerical methods for differential equations: higher order
   j. Numerical methods for differential equations: partial differential
   k. Application of numerical methods for power engineering

EP3095 Electrical Engineering Materials

1. Course number and name: EP3095 Electrical Engineering Materials

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Suwarno

4. Text books:
    a. Suwarno, Material Elektroteknik, Penerbit Megatama, 2006, (main)
    b. S.O. Kasap, Principles of Electrical Engineering Materials and Devices, Irwin Mc Graw Hill,1997, (supporting)
    c. L. Solymar, D. Walsh, Lectures on the Electrical Properties of Materials, Oxford University Press, USA, 1988, 4th Editio (supporting)

5. Specific course information
    a. brief description of the content of the course (catalog description): classical and modern electron theories; atom structure, electron statistics and energy band theory, properties of conductor, superconductor, semiconductor, dielectrics, magnetic and optical materials.
    Prerequisites or co-requisites:
    - EL2006 Electromagnetic Field (prerequisites)

    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: understanding on electron and atom theory, conductor characteristics, superconductor, semiconductor, dielectric, magnetic and optic include the theory that has connected with the materials.
    b. student outcomes addressed by the course: a,e,j

7. Brief list of topics to be covered
    a. Classical and Modern Electron Theory
    b. Schrodinger Equation
    c. Atom Structure and Electron Statistic
    d. Conductor Material
    e. Superconductor
    f. Semiconductor Material
    g. Dielectric Material
    h. Magnetic Material
    i. Optic Material

EP3075 Power System Analysis

1. Course number and name: EP3075 Power System Analysis

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Muhammad Nurdin

4. Text books:
   a. J. J. Grainger, W. D. Stevenson, JR, Power System Analysis, McGraw-Hill, 1994, (main)
   b. M. El Hawary, Electrical Power System, Design & Analysis, IEEE Press, 1995 (supporting)
   c. Prabha Kundur, Power System Stability & Control, McGraw-Hill, 1994, (supporting)

5. Specific course information
   a. brief description of the content of the course (catalog description):
      Introduction, per-unit system, representation of power system components, Transmission line parameter, Introduction to HVDC transmission, Network modelling and calculation, Power flow solution, Symmetrical and unsymmetrical faults, Transient stability, System controls, Introduction to economic operation.
      Prerequisites or co-requisites:
      - EL2001 Electric Circuit (prerequisites)
      - EP3071 Electrical Machinary (co-requitsites)
   b. required, elective, or selected elective: required

6. Specific goals for the course
   a. Specific outcomes of instruction: understand and have an ability to calculate and to analyse: power system component parameters, power flow, symmetrical and unsymmetrical faults, and transient stability; and they know about the principles of power system controls and economic operations.
   ~~b.~~ student outcomes addressed by the course: a,e,k

7. Brief list of topics to be covered
   a. Introduction
   b. Power System Component Representation
   c. AC Transmission lines parameters
   d. Underground cable lines relation between voltage and current
   e. Transmission lines performance
   f. Admittance model and network calculation
   g. Impedance model and network calculation
   h. Power flow solutions
   i. Symmetrical faults
   j. Unsymmetrical faults
   k. Transient Stability of System

l. Introduction to power system controls
m. Introduction to power system economics

EP3171 Electrical Power Laboratory I

1. Course number and name: EP3171 Electrical Power Laboratory I

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Tri Desmana Rachmildha

4. Text books:-

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Synchronous machines, Asynchronous machines, Power Transformer, DC machines. Power System Analysis Practice consists of Preparation of ETAP software, Load flow and Contingency analysis, Symmetrical and Unsymmetrical short circuit analysis, Motor starting analysis and Transient stability analysis, Control system Practice.
    Prerequisites or co-requisites:
    - EP3075 Power System Analyst (co-requisites)
    - EP3071 Electrical Machinary (co-requisites)
    - EL3015 Control System (co-requisites)
    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: -
    b. student outcomes addressed by the course: b,f,k

7. Brief list of topics to be covered: -

EP3070 Electric Power Plant

1. Course number and name: EP3070 Electric Power Plant

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Bambang Anggoro

4. Text books:
   a. PK Nag, Power Plant Engineering System, Second Edition, McGraw-Hill, 2002 (main)
   b. Paul Breeze, Power Generation Technologies, Elsevier Newnes, 2005, (main)

5. Specific course information
   a. brief description of the content of the course (catalog description):
      Introduction to electricity generation, economics of power generation, analysis of steam cycles, combined cycle power generation, fuels and combustion, combustion mechanism, combustion equipment and firing methods, steam generator, steam turbines, condenser, feedwater and circulating water systems, nuclear power plant, hydroelectric power plant, diesel engine and gas turbine power plants, energy storage
      Prerequisites or co-requisites:
      - MS2041 Thermal Engineering & Fluid Mechanics (prerequisites)
      - EP3071 Electrical Machinery (prerequisites)
   b. required, elective, or selected elective: required

6. Specific goals for the course
   a. Specific outcomes of instruction: understanding and exposing the students to modern methods of electric power generation with analysis firmly based on thermodynamics ,heat transfer and fluid mechanics.
   b. student outcomes addressed by the course: a,c,e,h,k

7. Brief list of topics to be covered
   a. Introduction
   b. Economic Factor of Electrical powerplant
   c. Steam Cycle Analysis
   d. Combined Cycle Powerplant
   e. Fuel and combustion
   f. Combustion Mechanism
   g. Tools and Ignition Methods
   h. Steam Power plant
   i. Steam Turbine
   j. Condenser
   k. Boiler feed water and water circulation system
   l. Nuclear Power plant.

EP3072 Power Electronics

1. Course number and name: EP3072 Power Electronics

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Pekik Argo Dahono

4. Text books:
    a. Mohan, et.al., Power Electronics, John Wiley, latest ed. (main)
    b. Kassakian, et.al., Principles of Power Electronics, Addison Wesley, latest ed. (supporting)

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Basic concept of power electronics and power converters. Power semiconductor, ac-ac, ac-dc, dc-dc, dc-ac, power converters and its applications. Power converter controls.
    Prerequisites or co-requisites:
    - EL2001 Electrical Circuit (prerequisites)
    - EL2005 Electronics (prerequisites)

    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: explain basic concept of power conversion with electronics technology and the function
    b. student outcomes addressed by the course: a,e,k

7. Brief list of topics to be covered
    a. Introduction
    b. Power Semiconductor Switch
    c. Rectifier
    d. AC Voltage Regulator
    e. 4 quadrant converter and cycloconverter
    f. DC-DC Converter
    g. DC-AC Converter
    h. Soft Switching
    i. Power Switching and UPS
    j. Motor Control
    k. PWM rectifiers
    l. Power Electronic in Power System

EP3074 High Voltage Engineering

1. Course number and name: EP3074 High Voltage Engineering

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Umar Khayam

4. Text books:
    a. Darwanto, Djoko; Teknik Tegangan Tinggi; Lecture Notes, (main)
    b. Hilgarth, Guenther; Hochspannungstechnik; B.G. Teubner Stuttgart (supporting)
    c. Kind, Dieter; Pengantar Teknik Eksperimental Tegangan Tinggi; Penerbit ITB Bandung, (supporting)
    d. Andreas Kuechler; Hochspannungstechnik; Springer Verlag, (supporting)

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Introduction to high voltage energy transportation, high voltage engineering application in industry. Electrical field, Electrical Field Measurement Methods, Gas, liquid, and solid translucent Mechanism, high voltage isolation, high voltage measurement and test.
    Prerequisites or co-requisites:
    - EL2001 Electrical Circuit (prerequisites)
    - EL2006 Electromagnetic Field (prerequisites)

    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: get basic knowledge about high voltage and the function in energy transportation. Have knowledge about measurement, do analysis about electrostatic field in high voltage tools. Have knowledge about dielectric about isolation under high voltage condition include gas, liquid, and solid. Understanding how to measure high voltage and high voltage test.
    b. student outcomes addressed by the course: a,e,f

7. Brief list of topics to be covered
    a. Introduction to high voltage engineering
    b. Electrical Fields
    c. Electrical Fields Measurements
    d. Material in Electrical Fields
    e. Multi Layer Dielectric
    f. Conformal Mapping
    g. Gas Discharge
    h. Gas Breakdown
    i. Gas Isolation
    j. Solid Isolation
    k. High Voltage Generation

l. High Voltage Measurement
m. High Voltage Test

EP3076 Power System Protection

1. Course number and name: EP3076 Power System Protection

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Reynaldo Zoro

4. Text books:
    a. Dr. Reynaldo Zoro, "Sistem Proteksi pada Sistem Tenaga Listrik-Proteksi Tegangan Lebih", Lecture Notes, Penerbit ITB, 2002, (main)
    b. Greenwood, Electrical Transient in Power System, John Wiley, 19 (supporting)
    c. Jones, D., Analysis and Protection of Electrical Power System, Wheeler Publishing, 1st Edition, (supporting)
    d. Jones, D., Analysis and Protection of Electrical Power System, Wheeler Publishing, 1st Edition, (supporting)

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Introduction, overvoltage sources, travelling wave, lightning phenomenon, surge impedance of tower and transmission line, overvoltage protection equipment, lightning performance, insulation coordination, three phase system, line and system parameters under short circuit fault condition, review of symmetrical components and current and voltage calculation under short circuit faults, protection relay, relay coordination in protection system.
    Prerequisites or co-requisites:
    - EP3075 Power System Analysis (prerequisites)
    - EL2006 Electromagnetic Field (prerequisites)
    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: -
    b. student outcomes addressed by the course: a,c,d,e,i

7. Brief list of topics to be covered
    a. Introduction
    b. Temporary Over Voltage, Switching Over Voltage
    c. Lightning Over Voltage and Lightning Parameter
    d. Travelling Wave and Direct Lightning
    e. Direct and Indirect Lightning Strike
    f. Surge Impedance and wave velocity
    g. Over Voltage Protection Tools
    h. Introduction and general philosophy in power system protection in short circuit fault
    i. Relays source
    j. Basic Principlas of Protection Design

k. Basic Application and Relay Coordination
l.

EP3172 Electical Power Laboratory II

1. Course number and name: EP3172 Electrical Power Laboratory II

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Tri Desmana Rachmildha

4. Text books:-

5. Specific course information
   a. brief description of the content of the course (catalog description):
      Power Electronic Practice consists of Static Switching, DC to DC Converter, AC to DC Converter (Rectifier) and DC to AC Converter. High Voltage Engineering Practice consists of DC high voltage generation, Impulse high voltage generation, Voltage distribution on chain insolators, and Gas breakdown. Power System Protection Practice.
      Prerequisites or co-requisites:
      - EP3072 Power Electronics (co-requisites)
      - EP3074 High Voltage Engineering (co-requisites)
      - EP3076 Power System Protection (co-requisites)
   b. required, elective, or selected elective: required

6. Specific goals for the course
   a. Specific outcomes of instruction: -
   b. student outcomes addressed by the course: b,f,k

7. Brief list of topics to be covered: -
   a. Power electronics experiment
   b. High voltage experiments

EP4096 Final Project I and Seminar

1. Course number and name: EP4096 Final Project I and Seminar

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Deni Hamdani

4. Text books:
    a. Deny Hamdani, Pengantar Metodologi Penelitian: Panduan Penulisan Tugas Akhir, Penerbit ITB, 2010, (main)

5. Specific course information
    a. brief description of the content of the course (catalog description):
    Introduction to research methodology, procedure of research, scientific writing and presentations, lesson learned, guidance of final project proposal, preliminary research, seminar and evaluation
    Prerequisites or co-requisites: -
    b. required, elective, or selected elective: required

6. Specific goals for the course
    a. Specific outcomes of instruction: understanding on running research based on scientific methodology and capable of writing and presenting final project proposals
    b. student outcomes addressed by the course: a,c,d,e,f,g,I,j,k

7. Brief list of topics to be covered
    a. Introduction to research methodology
    b. Procedure of research
    c. Scientific writing and presentation
    d. Lesson-learned
    e. Guidance of final project proposal
    f. Preliminary Research
    g. Seminar and Evaluation

EP4077 Electrical Power Distribution System

1. Course number and name: EP4077 Electrical Power Distribution System

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Yusra Sabri

4. Text books:
    a. L.L. Grigsby, Electric Power Engineering, CRC Press 1998.
    b. 2. H Lee Willis, Power Distribution Planning Reference Book, Marcel Dekker, 1997
    c. 3. William H Kersting, Distribution System Modeling and Analysis, CRC Press, 2002
    d. 4. Electrical Distribution systems, The Fairmont Press inc 1999.
    e. 5. Turan Gonen, Electric Distribution System Engineering, Press, NewYork, 1996
    f. 6. Electric power distribution for industrial plants, IEEE Press 1996.

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. Introduction, Basic distribution system functions, Power distribution system loads, Distribution network system, Distribution system modelling and analysis, Power distribution system components (Conductor, Insulator, Fuse, Circuit breaker, Switchgear etc.), Overhead distribution systems, Underground distribution systems, Power quality and distribution power compensation, Reliability Power distribution systems, Distribution automation and SCADA systems
    b. prerequisites or co-requisites:
        i. EL2001 Electric Circuit (prerequisites)
        ii. EL3075 Power System Analysis (prerequisites)
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: a,c,e,j,k

7. Brief list of topics to be covered
    a. Introduction and Basic Distribution System Functions
    b. Power Distribution System Loads
    c. Power Distribution System Components And Switchgear
    d. Distribution Network System, Modelling And Analysis
    e. Distribution System Protection
    f. Overhead Distribution Systems
    g. Underground Distribution Systems
    h. Power Quality And Distribution Power Compensation
    i. Power Reliability Analysis
    j. DADSM

EP4091 Industrial Experience

1. Course number and name: EP4091 Industrial Experience

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Umar Khayam

4. Text books:

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. Students spend 2 months for internship programs (preferably during a summer break) to gain work experiences related to the field of electrical power engineering in companies/industries.
    b. prerequisites or co-requisites:
        i. Have passed 108 sks
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
        i. Students spend 2 months for internship programs (preferably during a summer break) to gain work experiences related to the field of electrical power engineering in companies/industries.
    b. student outcomes addressed by the course: d,f,g,i,j

7. Brief list of topics to be covered

EP4099 Final Project II

1. Course number and name: EP4099 Final Project II

2. Credits and contact hours: 4 credits/contact hours

3. Instructor's or course coordinator's name: Deny Hamdani

4. Text books:

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. Students carry out the proposed project in EP4096 Final Project I & Seminar, including an evaluation for assessing the extent to which it has addressed the formulated problem. Students submit project reports & resume paper and defend them at the Final project Exam.
    b. prerequisites or co-requisites:
        i. EP 4096 Final Project I and Seminar
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
        i. This course should bring understanding on running research based on scientific methodology and/or engineering problem solving, specially in the field of electrical power and capable of writing and presenting final project report
    b. student outcomes addressed by the course: a,c,d,e,f,g,I,j,k

7. Brief list of topics to be covered

EP4070 Electrical Power System Design

1. Course number and name: EP4070 Electrical Power System Design

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Syarif Hidayat

4. Text books:

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. Introduction, Products and System design principal on Electric Power System, Design Cycle, Quality management, documentation and technical specification on equipment and power system, Standards and practical of electric installation, HAKI and patent, Economic aspect on design, Safety and environmental aspect on design, Cases study, Group project.
    b. prerequisites or co-requisites:
        i. EP3075 Power System Analysis (prerequisites)
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: a,c,d,e

7. Brief list of topics to be covered
    a. Introduction and Design Overview Design
    b. Design Standar and International & National Electric Installation
    c. Best Practice Design and Electric Installation in Industrial
    d. Overview of Power System Engineering Drawings
    e. Transmission System Design
    f. Distribution System Design
    g. Substation Design
    h. Installation Design
    i. Study Case

EP4074 System Engineering

1. Course number and name: EP4074 System Engineering

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Nanang Hariyanto

4. Text books:
    a. Stuart Bennet, Real Time Computer Control, An Introduction, Second Edition, Prentice Hall International
    b. G J Olsder, Mathematical System Theory, Delftse Uitgevers Maatschappij
    c. Andrew P Sage, Methodology for Large Scale System, McGraw Hill Book
    d. Douglas V Hall, Microprocessor and Interfacing, Programming and Hardware, McGrawHill

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. System theory, microprocessor based controller, real time computer control, reliability concept and application, queing theory and application, engineering optimization, production cosf function, engineering economic, decision making analysis.
    b. prerequisites or co-requisites:
        i. EP3015 Control System (prerequisites)
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: a,c,d,e,f

7. Brief list of topics to be covered
    a. System Engineering, Modelling Principles
    b. Linear Differential System and State Space Analysis
    c. Computer, Microcomputer and Microprocessor
    d. Real Time Computer Control
    e. Relibility in Engineering System

EP4075 Electric Motor Applications

1. Course number and name: EP4075 Electric Motor Applications

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Agus Purwadi

4. Text books:
    a. ---------, A Tutorial in AC Induction and Permanent Magnet Synchronous Motors. Analog Devices 1994
    b. Yanuarsyah Haroen, Diktat : Analisis Peralihan pada Mesin Elektrik, 1998.

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. Introduction. Characteristic of mechanical load. Modelling and control of DC machines by phase control rectifier and chopper with minimum ripple. Modeling of non salient and salient electricalmachines, Park dq transformation and complex system (space phasor) by using power invariant and amplitude invariant. Scalar control and vector control of induction motor. Space vector of induction machines. Vector control of synchronous motor and permanent magnet synchronous motor (brushless DC motor).
    b. prerequisites or co-requisites:
        i. EP3071 Electric Machinery (pre-requisite)
        ii. EP3015 Control System (pre-requisite)
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: a,e,j,k

7. Brief list of topics to be covered
    a. Introduction
    b. Mechanic Load Characteristics
    c. Modelling and Control of DC Machine using Phase Control Rectifier and Chooper with Minimum Ripple
    d. Modelling Salient and Non-Salient Electric Machine
    e. Park dq Transformation and Complex System (space phasor) using Power Invariant and Amplitude Invariant
    f. Scalar Control and Vector Control Induction Motor
    g. Space Vector in Induction Machine
    h. Vector Control Synchronous Motor Permanent Magnet (Brushless DC Motor)

EP4050 Electrical System Project Management

1. Course number and name: EP4050 Electrical System Project Management

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Burhanuddin Halimi

4. Text books:
    a. Hira N Ahuja, Project Management, John Wiley and Sons
    b. Albert Lester, Project Management, Planning and Control, Fifth Edition, Elsevier Science and Technology Book, 2006

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. The application of project management which includes basic project planning, project planning optimization techniques, project planning implementation and monitoring and control of the implementation of projects in the electricity system projects that include project planning and construction of power plant, transmission and distribution.
    b. prerequisites or co-requisites:
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
        i. Students have a good understanding of the science of project management that includes understanding the characteristics of the project, project planning, project planning optimal, implementation, monitoring and control project.
        ii. Students have the ability to make project planning of electrical systems using the science of project management,
        iii. Students know and understand the techniques of implementation, monitoring and control the implementation of the project electricity system
    b. student outcomes addressed by the course: d,g,h

7. Brief list of topics to be covered
    a. Project Definition
    b. Power System Project Planning
    c. Optimization Power System Project
    d. Planning Implementation, Monitoring and Control

EP4079 Relay Protection

1. Course number and name: EP4079 Relay Protection

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Nanang Hariyanto

4. Text books:
    a. Analysis of Faulted power systems .Paul Anderson
    b. Electrical Instalation Hand Book , Gunter G.Seip
    c. J. L. Blackburn, Protective Relaying, principles and application, Marcel Dekker, Inc., 1998

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. System protection, relays and relay systems, short circuit calculation, over current protection, distance protection ,differential protection, symmetrical components, unbalanced faults, scada, instrumentation and measurement, wide area protection, adaptive protection, earthing systems.
    b. prerequisites or co-requisites:
        i. EP3076 Power System Protection (pre-requisite)
        ii.EP3075 Power System Analysis (pre-requisite)
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
        i. Understand basic structure and apparatus electrical power system protection
        ii.Solve electrical power system protection problems
        iii. Calculate sort circuit current.
    b. student outcomes addressed by the course: a,c,e,k

7. Brief list of topics to be covered
    a. Introduction
    b. Electric Fault Source
    c. Grid Parameter and System Component
    d. Protection Coordination for Overcurrent
    e. Transmission System Protection
    f. Busbar Protection
    g. Generator Protection
    h. SCADA

EP4073 Selected Topics in Electrical Power System

1. Course number and name: EP4073 Selected Topics in Electrical Power System

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name: Pekik Argo Dahono

4. Text books:

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. Introduction. Electrical power technologies. World energy outlook, Indonesian energy outlook. Invited speakers from industries and other institution concerning electricity and related topics and softskill.
    b. prerequisites or co-requisites:
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: a,h,i,j

7. Brief list of topics to be covered
    a. Introduction
    b. Power Technology Development
    c. World Outlook Energy
    d. Indonesia Outlook Energy
    e. Guest Lecture

EP4072 SCADA and Energy Management System

1. Course number and name: EP4072, SCADA and Energy Management System

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Syarif Hidayat

4. Course categoty : Required (MK Wajib) atau Elective (MK Pilihan)

5. Pre-requisites : Instrumentation system

6. Assessment methods : Midterm/Final, Projects

7. Text books:-
   Minis. Thomas & John D. McDonald, "Power System Scada and Smart Grids", CRC Press, Boca Ratton, 2015

8. Brief description :
   The Course provides students in the area of control Engineering and Automation, Mechatronics and Energy Systems about conceptions, structure, components, human-machine interfaces (HMI), alarms, course focuses on modern SCADA Fuction on Power System. At the end of the course, students should design a complex SCADA and control system.

9. Specific goals for the course
   Upon successful completion of the course, the student will be able to do following :
   a. Be conversant in SCADA nomenclature
   b. Describe the typical architecture of a SCADA system
   c. Demonstrate knowledge of the basic technology of each of SCADA's majorbuilding blocks
   d. Determine when a SCADA system would be useful to industrial operations, especially in power system
   e. Select the appropriate SCADA technologies for your operational requirements
   f. Configure the successful application of SCADA, determine cabling, fiber optics, connectors, and hardware that meet the electrical noise, vibration, temperature, and durability requirements of industrial equipment
   g. Evaluate network protocols that provide interoperabilityand time-critical control of smart devices and machines

10. Brief list of topics to be covered: -
    a. Power system automation
    b. SCADA fundamentals
    c. SCADA communication
    d. Substation automation (SA)
    e. Energy management system (EMS) for controlcenters

f. Distribution automation and distribution management (DA/DMS) systems
g. Smart grid concepts

EP4071 Utilization of Electrical Energy

1. Course number and name: EP4071 Utilization of Electrical Energy

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Ngapuli Irmea Sinisuka

4. Text books:
   a. C.L. Wadhwa, Generation, Distribution and Utilization of Electrical Energy, New Age International (P) Limited Publisher, New Delhi 2005

5. Specific course information
   a. brief description of the content of the course (catalog description):
      i. Introduction ; Basic of Heating ; Thermal Insulation ; Electric Heating ; Electric Furnace ; Lighting ; Electric Drive ; Electric Precipitation ; Other industrial electric applications ; District Cooling, Heating and Power ; Energy Efficiency ; Environmental Consideration.
   b. prerequisites or co-requisites:
      i. EP 3071 Electric Machinery
      ii. MS2041 Thermal Engineering and Fluid Mechanic
   c. required, elective, or selected elective: selected elective

6. Specific goals for the course
   a. specific outcomes of instruction:
   b. student outcomes addressed by the course: a,c,d,e,h

7. Brief list of topics to be covered
   a. Introduction
   b. Basic of Heating
   c. Thermal Insulation
   d. Electric Heating
   e. Electric Furnace
   f. Lighting
   g. Electric Drive
   h. Electric Precipitation
   i. Other Industrial Electric Applications
   j. District Cooling, Heating and Power
   k. Energy Efficiency
   l. Environmental Consideration
   m. Resume

TI3004 Engineering Economics

1. Course number and name: TI3004 Engineering Economics

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name:

4. Text books:

5. Specific course information
    a. brief description of the content of the course (catalog description):
        i. The course studies the concept of time value of money and its utilization for evaluastion and analysis of engineering decision making such as investment, equipment replacement, etc. The course covers: Definition and scope of engineering economics, cash flow, concept of time value of money, present equivalent value, annual value, internal rate of return, payback period, profitability index method, sensitivity analysis, depreciation, inflation and deflation, replacement analysis, tax analysis, and cost-benefit analysis.
    b. prerequisites or co-requisites
    c. required, elective, or selected elective: selected elective

6. Specific goals for the course
    a. specific outcomes of instruction:
    b. student outcomes addressed by the course: -

7. Brief list of topics to be covered
    a. Definition and scope of engineering economics
    b. cash flow
    c. concept of time
    d. value of money
    e. present equivalent value
    f. annual value
    g. internal rate of return
    h. cost-benefit analysis
    i. payback period
    j. profitability index method
    k. sensitivity analysis
    l. depreciation
    m. inflation and deflation
    n. replacement analysis
    o. tax analysis.

MS2041 Thermal Engineering & Fluid Mechanics

1. Course number and name: MS2041 Thermal Engineering & Fluid Mechanics

2. Credits and contact hours: 2 credits/contact hours

3. Instructor's or course coordinator's name:

4. Text books:

   Michael J. Moran dan Howard N. Shapiro, Fundamentals of Engineering Thermodynamics, Edisi ke-4, John Wiley & Sons, 2000.
   White, F. M., Fluid Mechanics, McGraw-Hill,

5. Specific course information
   a. brief description of the content of the course (catalog description):
   i. This course deals with basic concepts of thermodynamics and fluid mechanics with its applications in the analysis of simple thermodynamics systems. It is intended for non mechanical engineering students and it discusses the basics of thermodynamics, fluid mechanics, heat transfer, and its applications. The syllabus embarks on an integrated approach to thermodynamics, fluid mechanics, and heat transfer, and its applications in thermal system engineering.
   b. prerequisites or co-requisites: Mathematics 1 and II, Elementary Physics, General Chemistry
   c. required, elective, or selected elective: selected elective

6. Specific goals for the course
   a. specific outcomes of instruction:
   b. student outcomes addressed by the course: -

Brief list of topics to be covered:

1. Introduction and basic concepts
2. Energy and Thermodynamics Law 1
3. Energy Analysis on Controlled-Volume
4. Thermodynamics Law 2
5. Power Generation Principle on Steam Turbine
6. Power Generation Principle on Gas Turbine
7. Ideal cycle and real cycle of 4 and 2 strokes ICE
8. Introuduction to Static Fluid
9. Static Fluid

10. Basic Principles of Flow of Fluid
11. Fluidic viscocity flow under pipe
12. Fluid Pump

ET3003 Computer Networks

1. **Course number and name**
   ET3003 Computer Networks

2. **Credits and contact hours**
   3credit hours, 3 hours lecture

3. **Instructor's or course coordinator's name**
   Dr. Tutun Juhana, ST, MT

4. **Text books required**
   TCP/IP Protocol Suite, Fourth Edition, Behrouz A. Forouzan, McGraw-Hill

5. **Specific course information**
   Course description
   This course covers computer networking algorithms and protocols of TCP/IP protocol suite. Topics include Internet Protocols (IPv4, IPv6, ICMP), addressing (ARP), auto-configuaration (DHCP), inter- and intra-domain routing (RIP, OSPF, and BGP), transport protocols (TCP), name services (DNS), end-to-end services. Protocols for the next-generation Internet will also be discussed

6. **Specific goals for the course**
   a. Specific outcomes of instruction (Course learning objectives)
   After successfully completing the course, the students will be able to:
   - Understand the OSI model and TCP/IP protocol suite
   - Understand some of underlying technologies
   - Understand IPv4 and IPv6 addressing
   - Perform network subnetting
   - Understand Address Resolution Protocol (ARP)
   - Understand Internet Control Message Protocol Version 4 (ICMPv4)
   - Understand how to deliver and forward the IP packets
   - Understand unicast routing protocols (RIP, OSPF, and BGP)
   - Understand User Datagram Protocol (UDP)
   - Understand Transmission Control Protocol (TCP)
   - Understand Domain Host Configuration Protocol (DHCP)
   - Understand Domain Name System (DNS)
   - Understand remote login: TELNET and SSH
   - Understand WWW and HTTP
   - Understand e-mail (SMTP, POP, IMAP and MIME)
   - Understand Simple Network Management Protocol (SNMP)

   b. Relationship of course to program outcomes:

The course supports program outcomes 1, 5 and 11 as required by ABET Criterion 3 of EAC (Engineering Accreditation Commission):
Outcome 1: apply knowledge of mathematics, science, and engineering [ABET Criterion 3 a]
Outcome 5: identify, formulate, and solve engineering problems [ABET Criterion 3 e]

7. Brief list of topics to be covered

- Introduction and underlying technologies
- Network layer
- Transport layer
- Application layer

ET3001 Analog and Digital Communication System

1. Course number and name

ET 3001 Analog and Digital Communication System

2. Credits and contact hours

3 credit hour, 3 hours lecture

3. Instructor's or course coordinator's name

Dr. Iskandar

4. Text books required

a. Simon Haykin. *Communication Systems*, John Wiley & Sons, 2001. *ISBN: 0-471-17869-1*.

b. B.P. Lathi. *Modern Digital and Analog Communication Systems*, Oxford University Press, 1998. *ISBN: 0-19-511009-9*.

c. A. Bruce Carlson. *Communication Systems*, Fourth Edition, Mc Graw Hill 2002. *ISBN: 0-07-011127-8*.

5. Specific course information

Course description:

General model and element of communication system; Spectra and Fourier transform; Linear continuous wave modulation; Exponential continuous wave modulation; Random signal and noise: random process, power spectral, baseband transmission with noise, transmission of narrowband noise, noise equivalent bandwidth; Noise in analog modulation system: band-pass noise; Linear continuous wave modulation with noise, exponential continuous wave modulation with noise; Analog to Digital conversion: sampling theory, aliasing, PAM, PCM, multiplexing; Digital modulation: ASK, FSK, PSK, QPSK.

Prerequisites

ET 2002 Probability & Statistics

6. Specific goals for the course

a. Specific outcomes of instruction (Course learning objectives)

After successfully completing the course, the students will be able to

- Describe the basic types of signals and signal representations in communications systems,
- Describe the basic signal processing techniques used for signal transmission in communications systems,
- Analyze generation and detection of linear and exponential analog modulation techniques,
- Explain the basic principle of random process and noise,
- Perform analysis of CW modulation techniques in noisy channels,
- Describe the principle of pulse modulation,

- Perform analysis of digitization technique for analog signal,
- Explain the basic concept of baseband digital transmission.

b. Relationship of course to program outcomes:
The course supports program outcomes 1 and 5 as required by ABET Criterion 3 of EAC (Engineering Accreditation Commission)

Student Outcome 1: Apply knowledge of mathematics, science, and engineering [ABET Criterion 3 a].

Student Outcome 5: Identify, formulate, and solve engineering problems [ABET Criterion 3 e].

7. Brief list of topics to be covered

- Signal and Spectrum
- Linear Continuous Wave Modulation
- Exponential Continuous Wave Modulation
- Random Process and Noise
- Noise in Linear Modulation
- Noise in Exponential Modulation
- Pulse Modulation
- Digitization Technique for Analog Signal
- Introduction to Banpass Digital Transmission

EL3015 Control Systems

1. Course number and name: EL3015 Control Systems

2. Credits and contact hours: 3 credits/contact hours

3. Instructor's or course coordinator's name: Carmadi Machbub

4. Text books:
   a. Katsuhiko Ogata, Modern Control Engineering, Prnetice Hall, 2010, 5th edition, (Main)
   b. Norman S. Nise, Control System Engineering, John Wiley, 2011, 6th edition (Main)

5. Specific course information
   a. brief description of the content of the course (catalog description):
      The course covers control systems analysis and design for linier systems in case of stability or performance. System analysis and design are implemented using traditional approach in time and frequency domain. Introduction odern concept of state space and digital control system are also provided in the course.
   b. prerequisites or co-requisites:
      - EL2007 Signals & Systems (prerequisites)
      - EL3215 Control Systems Laboratory (co-requisites)
   c. required, elective, or selected elective: required

6. Specific goals for the course
   a. specific outcomes of instruction:
      - Ability to analyse and design of control system concepts including modeling, transient analysis, steady-state and linier systems stability, and designing control system in time and frequency domain.
      - Ability to use state space concept for modelling and its connection with transfer function model
      - Ability to analyze and design of simple digital control system
   b. student outcomes addressed by the course: a,e

7. Brief list of topics to be covered
   a. Basic elements of a control system, concept of feedback, open and closed-loop systems
   b. Mathematical modeling of physical SISO systems, linearized models, and transfer function
   c. Time-domain analysis and stability of control systems
   d. PID controller design for SISO systems
   e. Feedback control system analysis & design via root-locus method

f. Feedback control system analysis via frequency-domain method
g. Feedback control system design and implementation via frequency-domain method
h. Introduction to sampled data systems, discrete equivalents, and sample rate selection
i. Analysis & design of feedback control systems using MATLAB

APPENDIX B – FACULTY VITAE

Curriculum Vitae

1. Name : Dr.Eng. Achmad Munir
   Academic Rank : Assistant Professor
2. Education

Educations	Place/Institution	Field	Year
Doctor	Univ. Yamaguchi, Jepang	Electrical Engineering	2005
Magister	Univ. Yamaguchi, Jepang	Electrical Engineering	2002
Undergraduate	ITB-Indonesia	Electrical Engineering	1995

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification of Lecturers	24 August 2011	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2012-2014

7. Honors and awards

No.	Honors and awards	Year
1	25th of Charter Satyalancana Karya Satya Award	2014
2	Outstanding Lecturer in 2012	2012

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title/Judul	Co Author	Journal/Conference	Year
1	Design and Implementation of DCBOTA in Delta-Sigma ADC for Communication System	Vincentius Timothy, Aditya Candra, Khafit Mufadli, Achmad Fuad Mas'ud, Amy Hamidah Salman	ICEEI 2015	2015
2	Comparative Experimental Study of Formation Control of Mobile Robots	Samratul Fuady, Adrianto Ravi Ibrahim, Bambang Riyanto Trilaksono	The 4th International Conference of Electrical Engineering, Electronics and Informatics (ICEEI 2013), June 24-25 2013, Selangor, Malaysia	2013

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Agung Wahyu Setiawan, ST.,MT.
   Academic Rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Magister	ITB-Indonesia	Electrical Engineering	2008
Undergraduate	ITB-Indonesia	Electrical Engineering	2005

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2011

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Color retina Image coding based on entropy-constrained vector quantization	Agung Wahyu Setiawan, Tati R Mengko	Singapore, Second International Conference on Digital Image Processing, 26-28 Feb 2010	2010

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Ir. Amy Hamidah Salman, M.Sc.
   Academic rank : Lecturer
2. Education

Educations	Place/Institution	Field	Year
Magister	Queen's University, Kingston, Ontario, Canada	Electrical Engineering	1987
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1975

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	24-Agu-11	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2012-2015

7. Honors and awards

No.	Honors and Awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Performance Comparison of Denoising Methods for Heart Sound Signal	Amy H. Salman, Nur Ahmadi, Richard Mengko, Armein Z. R. Langi, and Tati L. R. Mengko	Proceeding Internasioal, ISPACS 2015	2015
2	MASH Delta Sigma ADC Layout for Dual Mode GSM & WLAN Application	Clement Christopher, Adityo Prabowo, Misly Juliani, Amy Hamidah Salman, Achmad Fuad Mas'ud	Proceeding Internasioal, ICEEI 2015	2015
3	Establishment of Wi-Fi Display Session between Source and SinkDevice in Wireless Android Screencasting	Yacob W. Sitorus, Gabriel Frans, Prasetiyo Prasetiyo, Trio Adiono, Amy H. Salman, and Nur Ahmadi	Proceeding Internasioal, ISPACS 2015	2015

4	Design and Implementation of DCBOTA in Delta- Sigma ADC for Communication System	Vincentius Timothy, Aditya Candra, Khafit Mufadli, Achmad Fuad Mas'ud, Amy Hamidah Salman	Proceeding Internasioal,ICEEI 2015	2015
5	The SoC Design And FPGA Implementation Of Digital TV Receiver	Willy Anugrah Cahyadi, Trio Adiono, Amy Hamidah Salman and Yusuf Kurniawan	Proceedings of the 1st International Workshop on Industrial IT Convergence, Bandung, Indonesia August 28-29, 2012.	2012
6	SOC Design and FPGA Implementation of Digital TV Receiver	Amy Hamidah Salman, Trio Adiono, Willy Anugrah Cahyadi, Yusuf Kurniawan	The 7th International Conference on Telematics System, Services, and Applications (TSSA), 30-31 October 2012 ISBN: 978-1-4673-4548-5	2012
7	Heart Sound Visualization and Classification for Home Health Care Use	Amy Hamidah S and Astri Maria K	International Conference on Women's Health in Science & Engineering (WiSE-Health) 2012, Bandung, December 6 - 7, 2012	2012
8	Filter Based Envelope Detection Algorithm For Low Complexity Heart Sound Analysis	Astri Maria K. , Richard K. Mengko, Amy Hamidah S	International Conference on Women's Health in Science & Engineering (WiSE-Health) 2012, Bandung, December 6 - 7, 2012	2012
9	Design and Implementation 2k/4k/8k FFT-IFFT Core using Block Floating Point for DVB-T and DVB-H	Amy Hamidah Salman and Andy'es Fourman Duta Akbar Sudirdja	Proceeding Internasional,14th IEEJ International Analog VLSI Workshop, 2-4 November 2011.	2011

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Arif Sasongko, ST, M.Sc., Ph.D.
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Doctor	University Joseph Grenoble, Perancis	Electrical Engineering	2004
Magister	ITB-Indonesia	Electrical Engineering	2000
Undergraduate	ITB-Indonesia	Electrical Engineering	1998

3. Academic experience

No.	University	Title	Year	FT/PT
1	STEI-ITB	Head of The Study Program	2016 - 2017	FT

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification of Lecturers	24 August 2010	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2011-2014

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Optimized VHDL-based Karatsuba Polynomial Multiplier Generator for GF(2n)	Muhammad Husni Santriaji and Arif Sasongko	ISPACS 2015	
2	Development of Interface and Coordination for Control Module CNC PCB Milling Machine	Ariana Tulus Purnomo, Farkhad Ihsan Hariadi, and Arif Sasongko	ISPACS 2015	
3	Development of an FPGA- Based Sub- Module as Three- Phase Spindle Motor Speed Controller for CNC PCB Milling	Fiqih Tri Fathulah Rusfa, Farkhad Ihsan Hariadi, Arif Sasongko	ICEEI 2015	

4	Software for simplifying embedded system design based on event-driven method	Abdurohman, M., Sasongko, A.	International Journal of Electrical and Computer Engineering Vol.5 Issue.3	
5	Improved Generalizations of The Karatsuba Algorithm in GF(2n)	Muhamad Nursalman, Arif Sasongko, Yusuf Kurniawan, Kuspriyanto	The 2014 International Conference on Advanced Informatics: Concepts, Theory and Applications August 20-21th, 2014 ISSN: 2337-5787	
6	Three-loop Autopilot for Attitude Control System on Hardware In Loop Simulation	Angga Irawan, Bambang Riyanto Trilaksono, Rianto Adhy Sasongko, and Herma Yudhi Irwanto	3rd International Conference on Instrumentation, Communications, Information Technology, and Biomedical Engineering (ICICI-BME) Bandung, November 7-8, 2013	
7	Software for automated SoC design based on Hardware/Software CoDesign Concept	Maman Abdurohman, Adiwijaya, Gandeva Bayu Satrya, Arif Sasongko, Ricky Rawung	2013 IEEE International Conference on Electronics Technology and Industry Development, October 23 - 24, 2013, Bali, Indonesia	
8	Smart Card Mobile Data Collection System Concept For Health and Medical Data Collecting Activities in Rural Area	Beni Rio Hermanto, Adi Indrayanto, and Arif Sasongko	3rd International Conference on Instrumentation, Communications, Information Technology, and Biomedical Engineering (ICICI-BME) Bandung, November 7-8, 2013	
9	Secure Smartcard Chipset Design	Nana Sutisna, Arif Sasongko, Trio Adiono	2013 IEEE International Conference on Electronics Technology and Industry Development, October 23 - 24, 2013, Bali, Indonesia	
10	PintarOS : A Reconfigurable Multi-purpose Multi-Application Smart Card Operating System	Ricky Hariady, Arif Sasongko	2013 IEEE International Conference on Electronics Technology and Industry Development, October 23 - 24, 2013, Bali, Indonesia	

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Arwindra Rizqiawan, ST., MT
   Academic Rank : -
2. Education

Educations	Place/Institution	Field	Year
Doctor	Shibaura Institute of Technology, Jepang	Regional Environment Systems	2012
Magister	ITB-Indonesia	Electrical Engineering	2008
Undergraduate	ITB-Indonesia	Electrical Engineering	2006

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organisasi/Societies	Year/Period
1	IEEE Membership	2015

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Verifikasi Analitik Persamaan Maximum Torque Per Ampere (MTPA) untuk Permanent Magnet Synchronous Motor (PMSM)	Nur Adhinugraha Heryanto*, Agus Purwadi, Nana Heryana, dan Arwindra Rizqiawan	SENKA 2015	2015
2	Perhitungan dan Penentuan Ukuran Kabel DC untuk Aplikasi Pembangkit Listrik Tenaga Surya	Handoko Rusiana Iskandar, Arwindra Rizqiawan, Nana Heryana, dan Agus Purwadi		2015
3	Modeling of 1.6 kWp Single-Phase Grid-Connected Photovoltaic System.	Agus Purwadi, Arwindra Rizqiawan, Reza Fachrizal and Nana Heryana	ICEEI 2015	2015

4	Magnetic Simulation Comparation of 30 kW Switched Reluctance Motor with 6/4 and 6/10 Design Configurations for Electric Vehicle	Umar Sholahuddin, Agus Purwadi, Nana Heryana, Arwindra Rizqiawan, and Yanuarsyah Haroen	2014 IEEE Joint International Conference on Electrical Engineering and Computer Science and the Second International Conference on Electric Vehicular Technology 24-25 November 2014, Bali, Indonesia, ISBN 978-1-4799-8477-IEEE Catalog Number: CFP14A95-CDR	2014
5	Design of Traction Motor 180kW type SCIM for KRL (EMU) Jabodetabek Re-Powering Project	Andri Setiyoso, Hilwadi Hindersyah, Agus Purwadi, and Arwindra Rizqiawan	2014 IEEE Joint International Conference on Electrical Engineering and Computer Science and the Second International Conference on Electric Vehicular Technology 24-25 November 2014, Bali, Indonesia, ISBN 978-1-4799-8477-IEEE Catalog Number: CFP14A95-CDR	2014
6	A Study on the Impacts of DC Fast Charging Stations on Power Distribution System	Yohanes Halim Febriwijaya, Agus Purwadi, Arwindra Rizqiawan, and Nana Heryana	2014 IEEE Joint International Conference on Electrical Engineering and Computer Science and the Second International Conference on Electric Vehicular Technology 24-25 November 2014, Bali, Indonesia, ISBN 978-1-4799-8477-IEEE Catalog Number: CFP14A95-CDR	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Ir. Bambang Anggoro Soedjarno, MT.
   Academic rank : Associate Professor
   Education

Educations	Place/Institution	Field	Year
Doctor	ITB-Indonesia	Electrical Engineering	2006
Magister	ITB-Indonesia	Electrical Engineering	1990
Undergraduate	ITB-Indonesia	Electrical Engineering	1979

2. Academic experience

No.	University	Title	Year	FT/PT
1	STEI-ITB	Head of The Study Program	2017	
2	STEI-ITB	Head of The Study Program	2016	
3	STEI-ITB	Head of The Study Program	2015	

3. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

4. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification of Lecturers	25 October 2008	

5. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

6. Honors and awards

No.	Honors and awards	Year
1	30th of Charter Satyalancana Karya Satya Award	2015
2	20th of Charter Satyalancana Karya Satya Award	2007
3	25 Year Award ITB	2005

7. Service activities

No.	Service Activity	Institution	Year
1			

8. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Studi Karakteristik Impedansi Pentanahan Konfigurasi Vertikal Dengan Variasi Panjang Batang Elektroda Menggunakan Injeksi Arus Bolak - Balik Berfrekuensi 50 – 2 M Hz	Bobby Bergy, Nasrun Hariyanto, Bambang Anggoro	SENKA 2015	
2	Studi Karakteristik Impedansi Pentanahan Konfigurasi Vertikal Dan Modifikasi Batang Elektroda Variasi Kedalaman Tabung Dengan Injeksi Arus Bolak Balik Berfrekuensi 50 Hz – 2 Mhz	Ika Mutiara Agustin, Waluyo, Bambang Anggoro	SENKA 2015	

3	Studi Karakteristik Impedansi Pentanahan Dengan Modifikasi Variasi Diameter Tabung Yang Berkonfigurasi Vertikal Dan Di Injeksi Arus Bolak-balik Yang Berfrekuensi 50 Hz – 2MHz	Sylvia Oktobella Puspitasari, Waluyo, Bambang Anggoro	SENKA 2015	
4	Measurement for electromagnetic interference of the household appliances by using shielded room	Hutomo Wahyu Nugroho dan Bambang Anggoro	SENKA 2015	
5	Transformer End-Of-Life Estimation Using Condition-Based Sampling Period Method	Karel Octavianus Bachri, Bambang Anggoro, and Adang Suwandi Ahmad	ISPACS 2015	
6	New Probabilistic Approach for Identification Event Severity Index Due To Short Circuit Fault	Nanang Hariyanto, Bambang Anggoro, Randi Noegroho	2014 IEEE Joint International Conference on Electrical Engineering and Computer Science and the Second International Conference on Electric Vehicular Technology 24-25 November 2014, Bali, Indonesia, ISBN 978-1-4799-8477-IEEE Catalog Number: CFP14A95-CDR	
7	The impedance characteristics and equipotential pattern in ground surface of horizontal and grid configuration of grounding systems which are injected by frequency variable alternating currents,	Bambang Anggoro	International Research Journal of Engineering Science, Technology and Innovation (IRJESTI) (ISSN-2315-5663) Vol. 2(2) pp. 17-28, February, 2013	

9. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Ir. Budiman Dabarsyah, MSEE
   Academic rank : Lecturer

2. Education

Educations	Place/Institution	Field	Year
Magister	University Southern California - Amerika Serikat	Electrical Engineering	1994
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1988

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2012-2014

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1				

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Burhanuddin Halimi, ST.,MT.,Ph.D.
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Seoul National University	Nuclear Engineering	2013
Master	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2002
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2000

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1				

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ing. Chairunnisa, ST.,MT.
   Academic rank : -

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Bochum Ruhr Universitat	Electrical Engineering	2007
Magister	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2002
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1998

3. Academic experience

No	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and Awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Development of High Sensitivity Amplifier for VLF Receiver Application.	Kusnandar, Kusmadi, Asep Najmurrokhman, S Sunobroto, C Chairunnisa and Achmad Munir	Proceeding Internasional, ICEEI 2016	2015
2	Capacitor-based Phase Shifter for 8 Elements Antenna Feeding Network.	Chairunnisa C, Diana Desiyanti and Achmad Munir	Proceeding Internasional, ICEEI 2015	2015
3	Capacitor-based Phase Shifter for 8 Elements Antenna Feeding Network	Dr. Ing. Chairunnisa, ST. MT.	Proceeding internasional, ICEEI 2015, Bali, 10-11 August 2015	2015
4	Beam Reconfiguration of Capacitor-based Square Patch Antenna Array	Nisa Sabrina Mulya, C Chairunnisa and Achmad Munir	Proceeding internasional, ICWT 2015	2015

5	Size reduction of printed log-periodic dipole array antenna using fractal koch geometry	Chairunnisa, Sihaloho, D.F., Munir, A.	International Journal on Electrical Engineering and Informatics Vol.7 Issue.2	2015
6	Numerical Analysis for Wave Propagation in Circular Waveguide Using Cylindrical Coordinate System-based FDTD Method	Rahmi Rahmatillah, Chairunnisa and Achmad Munir	The 2014 International Conference on Advanced Informatics: Concepts, Theory and Applications August 20-21th, 2014 ISSN: 2337-5787	2014
7	Investigation of Dielectric-Lined for Transmission Loss Reduction of Optical Waveguide	Hardi Nusantara, Aryan Setiawan, Chairunnisa, Achmad Munir	The 4th International Conference of Electrical Engineering, Electronics and Informatics (ICEEI 2013), June 24-25 2013, Selangor, Malaysia	2013
8	Enhancement of printed log-periodic dipole array antenna performance using fractal Koch geometry	A. Munir, D. Freshia and Chairunnisa	6th International Conference on Signal Processing and Communication Systems (ICSPCS) 2012 Proc., Gold Coast, Australia, Dec. 2012.	2012
9	Characteristic Of Printed Log-Periodic Fractal Koch Antenna as Influence of Number Of Its Elements	Achmad Munira, Dida Tuhu Putranto, Devy Freshiaa, Chairunnisaa	Proceeding Internasional,The 5th Indonesia-Japan Joint Scientific Symposium,pp. 524-527, Chiba, Japan, 25-26 October 2012	2012
10	Bandwidth Enhancement and Size Reduction of wlan Patch Antenna Using Metamaterials	Achmad Munir, Sutinah, Chairunnisa	Proceeding internasional. The 5th Indonesia-Japan Joint Scientific Symposium, pp. 329-332, Chiba, Japan, 25-26 October 2012	2012

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Ir. Djoko Darwanto
   Academic rank : Associate Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Institut Teknologi Bandung - Indonesia	Engineering Science	1989
Master	Technische Universtat Braunsweig – Germany	High Voltage Engineering	1980
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1976

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Macro demand spatial approach (MDSA) at spatial demand forecasting for transmission system planning	Sasmono S, Sinisuka NI, Atmopawiro MW, Darwanto D.	Int J Electr Eng Informatics 2015	2015
2	Effect of grid cell size on ground flash density of distribution powerlines	Darwanto D, Hamdani D, Arbi A, Wijanarko B, Arifian	Proceedings - 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Elvayandri, S.Si.,MT
   Academic rank : Expert Assistant
2. Education

Educations	Place/Institution	Field	Year
Magister	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2002
Undergraduate	Institut Teknologi Bandung - Indonesia	Mathematics	1993

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lectures	02-Sep-14	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2013-2015

7. Honors and awards

No.	Honors and Awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1				

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ir. Eniman Yunus Syamsuddin
   Academic rank : Associate Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	The Victoria University of Manchester	Doctor of Philosophy	1992
Magister	The Victoria University of Manchester	Master Of Science	1989
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1983

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Cerfitication Of Lectures	25-Okt-08	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2011

7. Honors and awards

No.	Honors and Awards	Year
1	25th of Charter ITB	2010
2	10th of Charter Satyalancana Karya Satya Award	2007
3	10th of Charter Satyalancana Karya Satya Award	2003

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Design and Implementation of Modular Home Automation Based on Wireless Network, REST API, and WebSocket	Atas Hasibuan, Muhammad Mustadi, Eniman Y Syamsuddin, and M. Anis Rosidi	Proceeding Internasional, ISPACS 2015	2015

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Ir. Farkhad Ihsan Hariadi, M.Sc.
   Academic rank : Lecturer
2. Education

Educations	Place/Institution	Field	Year
Magister	The University of Waterloo	Electrical Engineering	1991
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1987

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lectures	28-Sep-15	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2013

7. Honors and awards

No.	Honors and Awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Development of an FPGA-Based Sub-Module as Three-Phase Spindle Motor Speed Controller for CNC PCB Milling	Fiqih Tri Fathulah Rusfa, Farkhad Ihsan Hariadi, Arif Sasongko	Proceeding Internasional, ICEEI 2015	2015
2	Development of Interface and Coordination for Control Module CNC PCB Milling Machine	Ariana Tulus Purnomo, Farkhad Ihsan Hariadi, and Arif Sasongko	Proceeding Internasional, ISPACS 2015	2015

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Iskandar, ST.,MT.
   Academic rank : Associate Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Waseda University, Japan	Telecommunication Engineering	2007
Magister	Institut Teknologi Bandung - Indonesia	Telecommunication Engineering	2000
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1995

3. Academic experience

No.	University	Title	Year	FT/PT
1	STEI - ITB	Assistance Professor, Lecturer	1997-2003	FT
2	Waseda University	Research Assistant	2003-2007	PT
3	STEI - ITB	Associate Professor, Lecturer	2007-now	FT

4. Non-academic experience

No.	Company/Institution	Title	Year	FT/PT
1	PT. Pacific Satellite Nusantara	Ground Segment Engineer	1995-1997	FT

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	National Certification for Teaching	5 July 2010	
2	Certificate of Competence as Assesor from Indonesian Professional Certification Authority (BNSP)	2016	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE member # 94096076	2016-2017

7. Honors and awards

No.	Honors and Awards	Year
1	Satyalancana Karya Satya 10th ITB	2015

8. Service activities

No.	Service Activity	Institution	Year
1	Training Instructur	Lembaga Sandi Negara (LSN)	2016
2	Research Expert	Litbang Kominfo	2015

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	CINR Performance of Downlink Mobile WiMAX IEEE 802.16e Deployed Using Coexistence Cellular Terrestrial and HAPS	Iskandar and Andy Wahyudi	ITB Journal of ICT Research and Applications	2014
2	Carrier Aggregation Technique to Improve	Iskandar and Ratna Galih	Telkomnika Journal on Telecommunication,	2016

	Capacity in LTE-Advanced Network		Computing, Electronics, and Control, TELKOMNIKA	
3	SC-FDMA LTE Performance Through High Altitude Platforms Communications (HAPS) Channel	Iskandar and D. Hidayat	Telkomnika Journal on Telecommunication, Computing, Electronics, and Control, TELKOMNIKA	2016
4	Variable step closed-loop power control with space diversity forlow elevation angle High Altitude Platforms communication channel	Iskandar, Adit Kurniawan, and M.E. Ernawan3	Buletin Pos dan Telekomunikasi	2016
5	Analysis of CDMA capacity for multiple stratospheric platform mobile communications under imperfect power control and fading	Iskandar and Shigeru Shimamoto	Proceedings IEEE Wireless Communications and Networking Conference (WCNC)	2007
6	On the Evaluation of Fixed Step Closed Loop Power Control for CDMA High Altitude Platforms (HAPs) Communication Channel	Iskandar, A. Kurniawan, and H. Syaputra	Proceedings IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)	2008
7	Step Size Optimization for Fixed Step Closed Loop Power Control on WCDMA High Altitude Platforms (HAPs) Channel	Iskandar, A. Kurniawan, E. B. Sitanggang, and S. Shimamoto	Proceedings IEEE Global Telecommunication Conference (GLOBECOM)	2008

10. Professional development activities

No.	Professional Development Actitvity	Year

Curriculum Vitae

1. Name : Dr.Ir. Isnuwardianto
   Academic rank : Lecturer

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Ecole Centrale de Lyon - Perancis	Electrotechnique	1991
Magister	Ecole Centrale de Lyon - Perancis	Electrotechnique	1987
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1983

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and Awards	Year
1	20st of Charter Satyalancana Karya Satya Award	2007
2	10th of Charter Satyalancana Karya Satya Award	2000

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1				

10. Professional development activities

No.	Professional Development Actitvity	Year

Curriculum Vitae

1. Name : Ir.Mervin Tangguar Hutabarat, M.Sc., Ph.D.
   Academic rank : Associate Professor

2. Education

Educations	Place/Institution	Field	Year
Doctor (S3)	University College of London	Integrated Circuit	2000
Master (S2)	The Ohio State University	Electrical Engineering	1992
First Degree (S1)	Institut Teknologi Bandung	Electrical Engineering	1988

3. Academic experience

No.	University	Title	Year	FT/PT
1	ITB	Head of ITB E-Learning Unit	2016	PT
2	ITB	Head of the Research Center for Information Technology and Communications	2014	PT
3	ITB	Head of the Research Center for Information Technology and Communications	2013	PT

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	National Lecturer Certification, Ministry of National Education	24 August 2011	-

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2015

7. Honors and awards

No.	Honors and Awards	Year
1	20th of Charter Satyalancana Karya Satya Award	11 August 2015

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	An Emulation of Transparent Interface Design Based on TCP/IP Implemented onto FPGA of an Altera Nios® Board	Arthur Silitonga, Mervin Hutabarat	TSSA 2015	2015
2	Kolaborasi di Proses Desain VLSI dengan Sistem Manajemen Pengetahuan	Rizki Ardianto P, Armein Z R Langi, Mervin T Hutabarat	Konferensi dan Temu Nasional Teknologi Informasi dan Komunikasi (TIK) untuk Indonesia; GOESMART 2014 "Smart System Platform for Nation" Bandung, 24-25 June	2014

			2014	
3	Low distortion (pi)-Attenuator using Series Connected Cold FETs and Bypass Capacitors	Mervin T Hutabarat	2013 IEEE International Conference on Electronics Technology and Industry Development, October 23 - 24, 2013, Bali, Indonesia	2013
4	DIGITAL LEARNING – LESSON STUDY (DL-LS) FOR TEACHER LEARNING COMMUNITY	Y. Bandung, Armein Z.R. Langi, Mervin T. Hutabarat	Joint International Conference on rural Information and Communication Technology and Electric Vehicle Technology,November 26-28, 2013, Bandung-Bali, Indonesia	2013
5	CLASSROOM SUITE SYSTEM FOR DIGITAL LEARNING	Fajar Arief Prabowo, Erick Stevanus, Yoanes Bandung, Erwin, Mervin T. Hutabarat	Joint International Conference on rural Information and Communication Technology and Electric Vehicle Technology ,November 26-28, 2013, Bandung-Bali, Indonesia	2013
6	Product Service System: Design of E-Commerce Solutions to Parking Space Optimization Using Bluetooth Technology	R. W. Tri Hartono and Mervin T. Hutabarat	International Conference on Electrical Engineering and Informatics (ICEEI 2011) 17-19 July 2011. ISBN: 978-1-4577-0750-6, IEEE Catalog Number: CFP1177H-PRT	2011
7	Design of 12-Bit, 40 MS/s Pipeline ADC for Application in WiMAX Transceiver	Permatasari, Siti Intan, Mervin T. Hutabarat, Adiseno	International Conference on Electrical Engineering and Informatics (ICEEI 2011) 17-19 July 2011. ISBN: 978-1-4577-0750-6, IEEE Catalog Number: CFP1177H-PRT	2011
8	Characterization of Network Performance on Wireless Network with Limited Capacity	Yudi Satria Gondokaryono, Yoanes Bandung, Mervin T. Hutabarat, Bryan Yonathan, Dwi Ramadhianto I.	International Conference on Rural Information and Conference Technology 2011,23 November 2011. ISBN 978-979-15509-6-3	2011

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Muhammad Amin Sulthoni, ST.,MT.
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Doctor (S3)	Tokyo Institute Technology - Jepang	Physical Electronics	2012
Master (S2)	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2005
First Degree (S1)	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2003

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	National Lecturer Certification, Ministry of National Education	28 September 2015	-

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2014-2015

7. Honors and awards

No.	Honors and Awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Design, Simulation, and Analysis of Parallel Double Quantum Dots by using SIMON Software	Rachmad Vidya W. Putra, Hilman Mauludin, Dian Surgawiwaha, M. Amin Sulthoni	Seminar Forum Pendidikan Tinggi Teknik Elektro Indonesia (FORTEI 2014) Bandung 2 - 4 June 2014	2014
2	The Effect of Trisodium Citrate Concentration on the Size of Gold Nanoparticles as Catalyst in Growing Silicon Nanowire	M. Amin Sulthoni, Irman Idris, Suksmandhira Harimuri, Asep Rohiman	2013 IEEE International Conference on Electronics Technology and Industry Development, October 23 - 24, 2013, Bali, Indonesia	2013
3	Key Parameters for Developing Agricultural Electronics Service in Indonesia	Muhammad Amin Sulthoni and Irman Idris, Daiki Ishiura and Shunnichi Amemiya	2013 IEEE International Conference on Electronics Technology and Industry Development, October 23 - 24, 2013, Bali, Indonesia	2013

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ir. Nanang Hariyanto, MT
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Institut Teknologi Bandung - Indonesia	Electrical Engineering and Informatics	2010
Magister	Institut Teknologi Bandung - Indonesia	Electrical Power Engineering	1999
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1986

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	05-Jul-10	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2013-2015

7. Honors and awards

No.	Honors and Awards	Year
1	25th Of ITB Award	2014

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title/Judul	Co Author	Journal/Conference	Year
1	A Genetic Algorithm Approach Determining Simultaneously Location and Capacity Distributed Generation in Radial Distribution System.	Retno First Tyastuti, Mitani Yasunori, Nanang Hariyanto, Muhammad Nurdin and Khairudin	ICEEI 2015	2015
2	Dynamic Arc Modeling and Suppresion of Secondary Arc on 500 kV Transmission Lines for Single Pole Reclosure	Nanang Hariyanto, Arifin Wijaya and Kevin Marojahan	ICEEI 2015	2015
3	Placement of Shunt VAR Compensator Based on Sensitivity Analysis	Muhammad Nurdin, Fathin Saifur Rahman, Rizky Rahmani, Nanang Hariyanto	IJEEI -STEI ITB - Jurnal Vol. 6 No. 2, June 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Prof.Dr.Ir. Suwarno, MT
   Academic rank : Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Nagoya University - Japan	Electrical Engineering and Electronics	1996
Masgiter	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1991
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1988

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	25-Okt-08	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2013-2015

7. Honors and awards

No.	Honors and Awards	Year
1	20th Of Charter Satyalancana Karya Satya Award	2013
2	Elektrical Equivalent Circuit Models of Partial Discharge and Leakage Current and Their Aplications for Diagnosis of High Voltage Equipments	2009
3	10th Of Charter Satyalancana Karya Satya Award	2004
4	1st Lecturer National Achievement Award	1970

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	AC and DC pre-stressed electrical trees in LDPE and its aluminum oxide nanocomposites	Chen X, Murdany D, Liu D, Andersson M, Gubanski SM, Gedde UW, Suwarno S	IEEE Trans Dielectr Electr Insul 2016	2016
2	Partial discharge in high voltage insulating materials	Suwarno	Int J Electr Eng Informatics 2016	2016
3	Thermal Aging of Ester from Palm Oil and Kraft Paper	Suwarno, Aminudin S	IARAS International Journal of Applied Physics	2016

	Composite Insulation			
4	Effects of Water Content on Dielectric Properties of Mineral Transformer Oil	Suwarno, M. Helmi Prakoso	WASET International Journal of Electrical, Computer, Electronic and Communication Engineering	2015
5	Partial discharge pattern of various defects measured by spiral antenna as UHF external sensor on 66 kV GIS model	Khayam U, Putro WA, Sriyono, Urano K, Min C, Suwarno, Kozako M, Hikita M	Int J Electr Eng Informatics 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Tutun Juhana, ST, MT
   Academic rank : Associate Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Institut Teknologi Bandung - Indonesia	Electrical Engineering and Informatics	2011
Magister	Institut Teknologi Bandung - Indonesia	Electrical Engineering (Telecommunication Information System)	1999
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1995

3. Academic experience

No.	University	Title	Year	FT/PT
1	STEI - ITB	Associate Professor	2015-now	FT
2	STEI - ITB	Coordinator of Master Program in Telematics and Networking Technology	2013-now	FT

4. Non-academic experience

No.	Company/Institution	Title	Year	FT/PT

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	HCDA		

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Member #94096290	

7. Honors and awards

No.	Honors and Awards	Year

8. Service activities

No.	Service Activity	Institution	Year
1	Radio Kampus unit Supervisor	ITB	

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Web-based FM Broadcasting Monitoring System	Tutun Juhana	ISESD 2016	2016
2	Smart Non Intrusive Power Consumption Monitoring System	Arif, T. Juhana	TSSA 2016	2016
3	The Effect of Scaling the	Hamonangan	TSSA 2016	2016

	Size of Topology and Content Stored on the Named Data Networking	Situmorang, Nana Rachmana, Tutun Juhana		
4	On the design of FM broadcasting remote monitoring system	Tutun Juhana	ICWT 2015	2015
5	Comparative performance evaluation of DSRC and Wi-Fi Direct in VANET	Izzati Shuhaimi, Heriansyah, Tutun Juhana	ICICI-BME 2015	2015

10. Professional development activities

No.	Professional Development Actitvity	Year
1	Internal Quality Assurance Facilitator for Directorate General of Belmawa, Indonesia Ministry of Research, Technology and Higher Education	

Curriculum Vitae

1. Name : Dr. Umar Khayam, ST.,MT.
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Khusyu Institut of Teknology Japan - Japan	Electrical Engineering	2008
Magister	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2000
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1998

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	02-Sep-14	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	2013-2015

7. Honors and awards

No.	Honors and Awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Partial Discharge Pattern of Various Defects Measured by Spiral Antenna as UHF External Sensor on 66 kV GIS Model	Umar Khayam1, Widya Anggoro Putro2, Sriyono2, Koji Urano3, Chen Min3, Suwarno1, Masahiro Kozako4, and Masayuki Hikita4	IJEEI -STEI ITB- Jurnal Vol. 6 No. 2, June 2014	2014
2	Characteristics of External Loop Sensor Located Near Bushing on Partial Discharge Induced Electromagnetic Wave Measurement	Suwarno1, Sriyono1,2,3, Yong-Joo Kim 2,4, Umar Khayam1, Masayuki Hikita2	International Journal on Electrical Engineering and Informatics, Printed ISSN 2085-6830/ online e-ISSN 2087-5886 No.5 Vol.1 2013	2013

3	Analysis of Distribution, Pattern, and Vector of Electric Field in the Inter Phases Region of Three-phase Gas Insulated Switchgear	Umar Khayam	International Journal on Electrical Engineering and Informatics, School of Electrical Engineering and Informatics, ITB Vol. 5 [4] 2013 ISSN 2085-6830/Online e-ISSN 2087-5886	2013
4	Electric Field Characteristics under Three-phase Voltage in Three-phase Gas Insulated Switchgear	Umar Khayam	International Journal on Electrical Engineering and Informatics (IJEEI), Vol. 4 No. 3, October 2012 ISSN 2085-6830, e-ISSN 2087-5886	2012
5	Examination of Single-phase Partial Discharge Monitoring Device for Partial Discharge Diagnosis on Three-phase GIS	Umar Khayam, Shinya Ohtsuka, Masayuki Hikita, Nobuko Otaka, Takakazu Matsuyama, Yoshiki Takehara	International Journal on Electrical Engineering and Informatics (IJEEI) vol. 2, no. 3, 2010	2010

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Ing. Ir. Yusra Sabri. Dipl. Ing SSE, DEA
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Undergraduate	ITB-Indonesia	Electrical Engineering	1976
Magister	ENSEEIHT Toulouse – France	Electrical Engineering	1978
Doctor	National Institute Polytechnique de Toulouse, France	Electrical Engineering	1981

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Decision area of distributed generation investment as deferral option in industrial distribution system using real option valuation	Sabri Y, Hadi PO, Hariyanto N	Int J Electr Eng Informatics.	2016
2	Determining Basic Cost of Electricity on the Regionalization System	Yusra Sabri, Hergamasantos Zein	Indonesian Journal of Elektrical Engineering and Computer Science	2016
3	Optimal cost valuation for renewable power plants using PSO in rural area	Sabri Y, Zein HS, Yusuf E	Int J Electr Eng Informatics	2015

4	Determining LBMP through Optimal Power Flow in the Electric Power Business	Hermagasanto Zein, Yusra Sabri	TELKOMNIKA Indonesian Journal of Electrical Engineering	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Yusuf Kurniawan, ST, M.T, Ph.D.
   Academic rank : Assistant Professor

2. Education

Educations	Place/Institution	Field	Year
Undergraduate	ITB-Indonesia	Electrical Engineering	1994
Magister	ITB-Indonesia	Electrical Engineering	1997
Doctor	ITB-Indonesia	Electrical Engineering	2007

3. Academic experience

No.	University	Title	Year	FT/PT
1				

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1			

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

).	Title	Co Author	Journal/Conference	Year
1	The Design of Mini PGP Security	Y. Kurniawan, A. Albone and H. Rahyuwibowo	International Conference on Electrical Engineering and Informatics (ICEEI 2011) 1719 Juli 2011. ISBN: 9781457707506, IEEE Catalog Number: CFP1177HPRT	
2	OC design and FPGA implementation of Digital TV receiver	A. H. Salman, T. Adiono, W. A. Cahyadi and Y. Kurniawan	elecommunication Systems, Services, and Applications (TSSA), 2012 7th International Conference on, Bali, 2012, pp. 125-129.	

3	Improved generalizations of the Karatsuba algorithm in GF(2n)	M. Nursalman, A. Sasongko, Y. Kurniawan and Kuspriyanto	Advanced Informatics: Concept, Theory and Application (ICAICTA), 2014 International Conference of, Bandung, 2014, pp. 185-190.	
4	Improved Generalizations of The Karatsuba Algorithm in GF(2n)	Muhamad Nursalman, Arif Sasongko, Yusuf Kurniawan, Kuspriyanto	The 2014 International Conference on Advanced Informatics: Concepts, Theory and Applications August 20-21th, 2014 ISSN: 2337-5787	
5	SOC Design and FPGA Implementation of Digital TV Receiver	Amy Hamidah Salman; Trio Adiono; Willy Anugrah Cahyadi; Yusuf Kurniawan	The 7th International Conference on Telematics System, Services, and Applications (TSSA), 3031 October 2012 ISBN: 9781467345485	

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Prof.Dr.Ir. Ngapuli Irmea Sinisuka
   Academic rank : Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Electrotechnique Toulouse – Prancis	Materiaux Electrotechnique	1978
Master	DEA Electrotechnique Grenoble – Prancis	Electrotechnique	1976
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1974

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	30-Jun-2008	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	The Use of Life Cycle Cost Analysis to Determine the most Effective Cost of Instakkation of 500 kV Java- Sumatra Power Interconnection System	Herry Nugraha, Zivion O. Silalahi, Ngapuli I. Sinisuka	IEEE Power and Energy Technology System Journal, Volume 3, No. 4, Desember 2016	2016
2	Maintenance decision models for java-bali 150-kV power transmission submarine cable using RAMS	Herry Nugraha, Zivion O. Silalahi, Ngapuli I. Sinisuka	IEEE Power and Energy Technology Systems Journal 2016	2016
3	Ageing characterization of colorimetric and photometric properties of commercial LED	Silalahi ZO, Dupuis P, Sinisuka NI, Massol L, Zissis G	IEEE Industry Application Society, 52nd Annual Meeting: IAS 2016. Portland,	2016

	lamps		OR, USA, 2 – 6 Oktober 2016	
4	Performance changes of energy saving lamps under lumen maintenance and switching stress test	Dupuis P, Silalahi ZO, Svensson I, Brundin J, Sinisuka NI, Zissis G	IEEE Industry Application Society, 52nd Annual Meeting: IAS 2016, Portland, OR, USA, 2 – 6 Oktober 2016	2016
5	Introducing adaptive multilevel inverter as A PV generator interface to power system	Suhana H, Sinisuka NI, Nurdin M, Besanger Y, Debusschere V	EEEIC 2016 - International Conference on Environment and Electrical Engineering, 6 – 8 June 2016, Florence, Italy	2016
6	DC Field Distribution in XLPE-Insulated DC Model Cable with Polarity Inversion and Thermal Gradient	Adi N, Teyssedre G, Sinisuka NI	IEEE ICHVE 2016, 19 – 22 September 2016, Chengdu, China	2016
7	A contribution to breakdown voltage characteristics in air for inter-electrode distances 1 - 10 μm at various pressures	Anuraga GT, Cambronne J-P, Dinculescu, Sinisuka NI, Makasheva K	IEEE NMDC (Nanotechnology Materials and Device Conference), 9 – 12 Oktober 2016, Toulouse, Prancis	2016
8	Color Shift study on the Practial LED Lamps during the ageing interface to power system	Silalahi ZO, Dupuis P, Massol L, Zissis G, Sinisuka N	LS15, Kyoto, Japan, 20 -26 May 2016	2016
9	Design-Related Space Charge in Insulation for HVDC Application	Gilbert Teyssedre, Thi Thu Nga Vu, Nugroho Adi, Severine Le Roy, Ngapuli I Sinisuka, Christian Laurent	International Conference on Science and Technology, 16-18 November 2016, Hanoi, Vietnam	2016

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Prof.Dr.Ir. Gibson Hilman Sianipar
   Academic rank : Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Ecole Centrale de Lyon	Electriqu	1984
Master	Ecole Centrale de Lyon	Electriqu	1981
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1973

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	25-Oct-2008	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Transient Short Circuit Current Calculation using Reduced and Decoupled DQ0 Networks	Gibson H.M. Sianipar	IEEE 6th International Conference on Power and Energy (PECON 2016), 28 – 29 November 2016, Melaka, Malaysia	2016
2	Analysis of Magnetic Saturation Effect in Closed Form Solution of Synchronous Machine Short Circuit Transient By Using Linear Segment Method	Astuti KN, Sianipar GHM	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
3	Implementation of Axis Rotation Fast Decoupled Load Flow	Setia GA, Santosa MF, Sianipar GHM	The 3rd IEEE Conference on Power Engineering and	2016

	on Distribution System		Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	
4	The Performance Comparison between Fast Decoupled and Backward-Forward Sweep in Solving Distribution Systems	Giri Angga Setia, Gibson H M Sianipar, Reynaldi T Paribo	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
5	An efficient data structure for radial distribution load flow	Sianipar GHM, Siahaan F	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ir. Muhammad Nurdin
   Academic rank : Associate Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Institute National Polytechnique de Grenoble - Prancis	Genie Electrique	1988
Magister	Institute National Polytechnique de Grenoble - Prancis	Genie Electrique	1985
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1978

3. Academic experience

No.	University	Title	Year	FT/PT
1	STEI – ITB	Head of The Study Program	2009 – 2013	
2	SPI - ITB	Internal Academic Auditor	2004 - 2011	
3	FTI - ITB	Secretary of Postgraduate Program of EE. Dept.	2001 - 2004	
4	FTI - ITB	Secretary of EE. Dept.	1998 - 2001	
5	FTI - ITB	Secretary for Student Affairs of EE. Dept.	1996-1998	

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	05-Jul-2010	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	1995 – present

7. Honors and awards

No.	Honors and Awards	Year
1	35th Of ITB Award	2016
2	30th Of Charter Satyalancana Karya Satya Award	
3	25th Of ITB Award	2005
4	20th Of Charter Satyalancana Karya Satya Award	2002

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title/Judul	Co Author	Journal/Conference	Year

1	Introducing Adaptive Multilevel Inverter as a PV Generator Interface to Power System	Hadi Suhana, **Ngapuli Irmea Sinisuka**, **Muhammad Nurdin**, Yvon Besanger, Vincent Debusschere	IEEE International Conference on Environment and Electrical Engineering (EEEIC 2016), Florence, Italy, June 6-8, 2016	2016
2	Voltage Profile Improvement Of The 20 KV Painan Distribution System With Multiple Distributed Renewable Energy Generation	Refdinal Nazir, **Muhammad Nurdin**, Eka Fitrianto	International Journal of Technology (2016) 1: 26-37	
3	A Genetic Algorithm Approach Determining Simultaneously Location and Capacity Distributed Generation in Radial Distribution System.	Retno First Tyastuti, Mitani Yasunori, Nanang Hariyanto, Muhammad Nurdin and Khairudin	ICEEI 2015	2015
4	Optimal switch placement in radial distribution system based on reliability worth analysis	Fitri Rahmawati, Nanang Hariyanto, Muhammad Nurdin, Mitami Yasunori, Khairudin	ICEEI 2015	2015
5	Sumatra-Java HVDC transmission system modelling and system impact analysis	Ricky Faizal, Muhammad Nurdin, Nanang Hariyanto, Pack S, Plesch J	IEEE Eindhoven PowerTech, PowerTech 2015	2015
6	Characteristic study of three-phase AC electric arc furnace model.	Nanang Hariyanto, Muhammad Nurdin, Gregorius Alvin Tanthio P.	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014
7	Placement of Shunt VAR Compensator Based on Sensitivity Analysis	Muhammad Nurdin, Fathin Saifur Rahman, Rizky Rahmani, Nanang Hariyanto	IJEEI -STEI ITB - Jurnal Vol. 6 No. 2, June 2014	2014
8	Oscillation Damping with Direct Load Control Based on PMU Measurement Data	Eko Aptono Tri Yuwono, Muhammad Nurdin, Nanang Haryanto	The 20th CEPSI 2014, Jeju Korea, 26 - 30 October 2014	2014
9	Underfrequency load shedding scheme using generator coherency approach	Fathin Saifur Rahman, Nanang Hariyanto	IEEE Workshop on Electronics, Computer and Applications, IWECA 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Prof.Dr.Dipl.-Ing.Ir. Reynaldo Zoro
   Academic rank : Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	TU Munich – Germany	High Voltage Engineering	1999
Master	Institut Teknologi Bandung - Indonesia	High Voltage Engineering	1990
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1973

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1	STEI – ITB	Head of High Voltage and High Current Laboratory	Chairman	2006 - 2008	

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	25-Oct-2008	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Analysis of Lightning Strike to Overhead EHV 500 Kv Transmission System Jawa – Bali Crossing	Harijanto PS, Zoro R	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
2	Multi-chamber arrester study at tropical area for 20 kV lines lightning protection system	Zoro R, Leo T	5th International Conference on Electrical Engineering and Informatics: Bridging the Knowledge between Academic, Industry, and Community, ICEEI 2015	2015

3	Lightning over voltage evaluation on DC 1.5 kV Overhead Contact System (OCS) for electrified railway in Indonesia	Puriza MY, Zoro R	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014
4	Overvoltages and insulation coordination on 150 kV substation in South Sumatera, Indonesia	Setiawan D, Khayam U, Zoro R	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014
5	. Lightning protection system on overhead distribution line using Multi Chamber Arrester	Perdana E, Hidayat S, Zoro R	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ir. Syarif Hidayat, MT.
   Academic rank : Associate Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	University of Tokyo	Electrical Engineering	1996
Master	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1991
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1988

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1	STEI-ITB	Head of High Voltage and High Current Laboratory	Chairman	2008 - 2012	

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	05-Jul-2010	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Design, Implemetation and Calibration of Electric Field Mill	Samuel Kamajaya, Ary P. N., Syarif Hidayat	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
2	Locating Lightning Using Time of Arrival Method in Western Part of Java Island	R. Jason, Ary P.N., S. Hidayat	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
3	Design And Testing Of Rogowski Coil Based	Helmi Wibowo, Ary P. Nurmansah, Syarif Hidayat	The 3rd IEEE Conference on Power	2016

	PCB Double Helix For Gas Insulated Switchgear 150 KV Aplication		Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	
4	Electric Field Optimization on 150 kV GIS Spacer by Modification of Spacer Shape and Conductor Configuration	Syarif Hidayat, Fransiskus Damanik, Umar Khayam	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
5	Effect of Bushing Material on the Electric Field Distribution of 150 kV GIS Bushing	Syarif Hidayat, Rachmad Pujianto, Umar Khayam	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
6	Scheduler and voice recognition on home automation control system	Hidayat S, Firmanda SF	3rd International Conference on Information and Communication Technology, ICoICT 2015	2015
7	Lightning protection system on overhead distribution line using Multi Chamber Arrester	Perdana E, Hidayat S, Zoro R	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ir. Pekik Argo Dahono
   Academic rank : Associate Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Tokyo Institute of Technologi - Japan	Electrical and Electronic Engineering	1995
Master	Tokyo Institute of Technologi - Japan	Electrical and Electronic Engineering	1992
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1985

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	25-Oct-2008	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	A new approach to reduce current ripple of PWM inverters by Variable Switching Period	Fadlika I, Dahono PA	2016 IEEE 8th International Power Electronics and Motion Control Conference, IPEMC-ECCE Asia 2016	2016
2	A Hysteresis Current Controller for Grid-Connected Inverter with Reduced Losses.	Dahono PA	2016 IEEE 8th International Power Electronics and Motion Control Conference, IPEMC-ECCE Asia 2016	2016
3	Suppressing The Effect of Unbalanced Grid in Current Controller of Grid Connected Inverter Using Virtual Inductor	Dahono PA	2016 IEEE 8th International Power Electronics and Motion Control Conference, IPEMC-ECCE Asia 2016	2016

4	Variable Switching Period to Achieve Minimum Output Current Ripple of Discontinuous PWM Three-Phase Voltage Source Inverters	Fadlika I, Afandi AN, Dahono PA	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
5	Output Current Ripple Minimization of Nine-phase PWM Inverters	Muqorobin A, Purwadi A, Dahono PA	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
6	Optimal displacement for nine phase inverter	Muqorobin A, Dahono PA	International Conference on Electric Vehicular Technology and Industrial, Mechanical, Electrical and Chemical Engineering, ICEVT 2015 and IMECE 2015	2015
7	Current ripple analysis of new double-stator AC drive systems	Fadlika I, Afandi AN, Dahono PA	Telkomnika Telecomun Compt Electr Control. 2015	2015
8	Influence of third harmonic injection signal on output current ripple and neutral current of three-level PWM inverter	Kastawan IMW, Harsoyo A, Hutabarat MT, Dahono PA	Int J Electr Eng Informatics 2015	2015
9	Input current ripple analysis of inverter fed dual three-phase Ac motors	Dahono PA, Satria A	International Power Electronics Conference, IPEC-Hiroshima - ECCE Asia 2014	2014
10	A control method for single-phase bidirectional converters	Saputra M, Prabowo Y, Dahono PA	ISTMET 2014 - 1st International Symposium on Technology Management and Emerging Technologies	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.Ir. Agus Purwadi
   Academic rank : Assistant Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2008
Master	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2004
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1985

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	2012	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE Membership	-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Parameters estimation of interior permanent magnet synchronous motor for electric vehicles by considering geometrical properties	Purwadi A, Rizqiawan A, Hutahean R, Heryana N, Heryanto NA	Adv Sci Lett. 2016	2016
2	Modelling and Analysis of High Frequency Resonant Inductive Power Transfer for Electric Vehicle Charging System	Agus Purwadi	IEEE PELS Workshop on Emerging Technologies : Wireless Power (WoW 2016), Knoxville, Tennessee, USA, October 4-6, 2016	2016
3	Speed Sensorless capability of 9-Slot 8-pole with Asymmetrical - Winding PM	Agus Purwadi	Proceedings of 8th IEEE-ICITEE 2016, 5-6 October 2016, Jogjakarta, Indonesia	2016

	Brushless DC Motor			
4	Design Procedure for 5 kW Mini Electric Vehicle SRM Drive Train	Agus Purwadi	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
5	Output Current Ripple Minimization of Nine-phase PWM Inverter	Agus Purwadi	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
6	Study and Design of Hybrid Off-Grid PV-Power System for Administration Load and Communal Load at Three Regions in Indonesia	Agus Purwadi	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
7	Prototype Development of a Low Cost Data Logger and Monitoring System for PV Application	Agus Purwadi	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
8	Analysis of Power Converters for High Frequency Resonant Inductive Electric Vehicle Charging System	Agus Purwadi	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
9	Design, Implementation and Techno-Economic Analysis of Hybrid PV-Diesel for Off-Grid System in Sebira Island	Agus Purwadi	The 3rd IEEE Conference on Power Engineering and Renewable Energy (ICPERE) 2016, 28 – 30 November 2016, Yogyakarta, Indonesia	2016
10	Comparison of maximum torque per Ampere and Constant Torque Angle control for 30kw Interior Interior Permanent	Purwadi A, Hutahaean R, Rizqiawan A, Heryana N, Heryanto NA	International Conference on Electric Vehicular Technology and Industrial, Mechanical, Electrical and Chemical Engineering, ICEVT	2015

	Magnet Synchronous Motor		2015 and IMECE 2015	
	Simple design verification of interior permanent magnet synchronous motor based on maximum torque per ampere and maximum torque per voltage approach	Rizqiawan A, Heryanto NA, Purwadi A, Heryana N, Hutahaean R, Hindersah H	International Conference on Electric Vehicular Technology and Industrial, Mechanical, Electrical and Chemical Engineering, ICEVT 2015 and IMECE 2015	2015

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr. Tri Desmana Rachmildha, ST.MT
   Academic rank : Assistant Professor
2. Education

Educations	Place/Institution	Field	Year
Doctoral	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2009
Master	Institut Teknologi Bandung - Indonesia	Electrical Engineering	2002
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1998

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	2012	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		-

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Study of Micro Grid Hybrid System of Photovoltaic and Diesel Engine	Novitasari D, Indartono YS, Harjono JE, Irsyad M, Rachmildha TD, Reksowardojo IK	MATEC Web of Conferences 2016	2016
2	Multicell inverter using simple hybrid control	Sari DK, Rachmildha TD, Haroen Y	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2016

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Dr.-Ing.Ir. Deny Hamdani
   Academic rank : -
2. Education

Educations	Place/Institution	Field	Year
Doctoral	TU Dortmund in Germany	Communication Enginering	2012
Master	TH Karlsruhe in Germany	Communication Enginering	2003
Undergraduate	Institut Teknologi Bandung - Indonesia	Communication Enginering	1997

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1					

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1					

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification Of Lecturers	2014	

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1	IEEE memberships	2011
2	VDE Member	2010

7. Honors and awards

No.	Honors and awards	Year
1		

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Effect of grid cell size on ground flash density of distribution powerlines	Darwanto D, Hamdani D, Arbi A, Wijanarko B, Arifian	ICPERE 2014: 2nd IEEE Conference on Power Engineering and Renewable Energy 2014	2014
2	Insertion loss analysis of low voltage power line filter based on EMC standards	Kurniawan E, Basuki R, Porman P, Wibawa IP, Hamdani D	International Conference on Electrical Engineering and Computer Science, ICEECS 2014	2014

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

Curriculum Vitae

1. Name : Prof.Dr. Carmadi Machbub
   Academic rank : Professor

2. Education

Educations	Place/Institution	Field	Year
Doctoral	Ecole Centrale de Nantes	Automatique & Inform	1991
Magister	Ecole Centrale de Nantes	Automatique & Inform	1988
Undergraduate	Institut Teknologi Bandung - Indonesia	Electrical Engineering	1980

3. Academic experience

No.	University	Academic rank	Title	Year	FT/PT
1	ITB	Head Control & Computer Syst. Research Group	Chair	2015 - now	PT
2	ITB	Vice Rector for Academic and Student Affairs	Vice Rector	2010 - 2011	FT
3	ITB	Senior Vice Rector for Resource Management	Senior Vice Rector	2005 - 2010	FT

4. Non-academic experience

No.	Company/Institution	Title	Description	Year	FT/PT
1	UNESCO	Ambassador	Alternate Permanent Delegate of the Republic of Indonesia		

5. Certifications or professional registrations

No.	Certification/Institution	Date of Issue	Date of Expiry
1	Certification of Lecturers	30 January 2008	-

6. Current membership in professional organizations

No.	Organizations/Societies	Year/Period
1		

7. Honors and awards

No.	Honors and Awards	Year
1	30th of Charter Satyalancana Karya Satya Award	2012
2	Charter of Ganesa Wira Adiutama Award	2010
3	25th of Charter ITB	2006
4	20th of Charter Satyalancana Karya Satya Award	2002

8. Service activities

No.	Service Activity	Institution	Year
1			

9. Publications and presentations

No.	Title	Co Author	Journal/Conference	Year
1	Exact Solution of Acoustic Source Position Estimation	Iwan Awaludin, Carmadi Machbub,Egi Muhammad Idris, Ary Setijadi Prihatmanto	ICSET, Syah Alam Kualalumpur	2015

2	Educational Game Design Using The 7 Steps for Designing Serious Games Method (Case Study: Mathematical Subject on Comparison and Scale Material for 7th Grade Junior High School)	Mohammad Iqbal, Carmadi Machbub and Ary Setijadi Prihatmanto	*International Conference on Interactive Digital Media (ICIDM),*Bandung, Indonesia, 2015	2015
3	Opponent Zigzag Movement Model Capture and Prediction in Robotic Socce	Dian Andriana, Carmadi Machbub and Ary Setijadi Prihatmanto	International Conference on Interactive Digital Media (ICIDM), Bandung, Indonesia	2015
4	New Methodology of Block Cipher Analysis using Chaos Game	Budi Sulistyo, Budi Rahardjo, Dimitri Mahayana, Carmadi Machbub	Jurnal Internasional,ITB J. ICT, Vol. 5 C, No. 2, 2011, 105-124 105	2011
5	Implementasi Algoritma Particle Swarm Optimization untuk Penentuan Posisi Optimum Router-router Campus-wide WMN	Santika W.P., Carmadi Machbub, Adi Indrayanto, Iping Supriana Suwardi	e-Indonesia Initiative 2010 (eII2010) Konferensi dan Temu Nasional Teknologi Informasi dan Komunikasi untuk Indonesia, 5-7 Mei 2010, Bandung	2010

10. Professional development activities

No.	Professional Development Actitvity	Year
1		

APPENDIX C – EQUIPMENT

Table C-1 shows the modules, objectives, and major facilities for Physics Laboratory for the first year students.

Table C – 1 . Physics Lab 1&2 (FI1101 & FI1201)

No.	Modules	Objective Usage	Facilities and Equipments
1	Fundamental of Measurement and Uncertainty	Be able to use basic measurement instruments Be able to determine uncertainty on single and repeated measurement Understand the meaning of significant number	Plastic ruler, Calliper,Micrometer screw, Stopwatch, Protactor, Thermometer, Ampere meter, Volt meter, Steel block, Small ball, Barometer, Technical balance, Weights
2.	Vibration	Determine spring constant and spring effective mass by doing weighted spring swing experiment. Determine gravitational constant by measuring extension of weighted spring.	Stative, Complementary scale stative, Spiral spring, Cylinder, Additional weights, Stopwatch, Millimeter block sheets
3.	Mathematical Pendulum	Determine gravitational constant using simple pendulum method. Determine period of swing with big deviation angle.	Personal computer with Logger Pro application program (1 set), LabPro interface (1 set), Pendulum system (1 set), Photogate (1 set), Ohauss balance
4.	Twist Modulus	Determine the material elasticity under twist effect. Determine shear modulus of material.	Twist equipment, Metal bar (2 bars), Long ruler, A set of weights, Micrometer screw, Millimeter block sheets.
5.	Young Modulus	Determine the Young modulus of material	2 pieces of wire, Main and nonius scale reader set, A set of weights, Long ruler, Micrometer screw, Millimeter block sheets.
6.	Atwood machine	Understand the concept of kinematic and show Newton Law validity and determine	Atwood machine, Stopwatch, Technical balance, Millimeter block sheets, Calliper

No.	Modules	Objective Usage	Facilities and Equipments
		moment of inertia of pulley.	
7.	Physical pendulum	Determine the gravitational constant using physical pendulum.	Physical pendulum, Pivot hanger , Stopwatch, Ruler, Balance
8.	Calorimeter	Determine the specific heat capacity of material using calorimeter.	Calorimeter with stir bar and protector vessel, Material, Thermometer (0^0-50^0 C and 0^0 – 100^0 C), Technical balance and weights, Measure glass 5ml, Oven.
9.	Moment of Inertia	Understand the role of moment of inertia on rotation motion of rigid body. Determine the moment of static and dynamic inertia of rigid body	Square and cylinder metal fragment, Stative with swing torsion wire, Calliper and micrometer screw, Stopwatch, Technical balance and weights.
10.	Length thermal expansion of metal	Understanding effect of temperature increasing to material, especially metal.	Metal pipes, Stative with metal clipper and ruler, Cylinder wheel with scale pin, Scale indicator of length expansion, Thermometer, Boiler with rubber pipe connector, Bunsen burner, Calliper and ruler.
11.	Oscilloscope	Describe the working principle of CRT. Use the oscilloscope to measure AC and DC voltage, frequency and phase difference. Use the oscilloscope to analyze form of waves.	Oscilloscope (1 set), Signal generator (2 set), Multimeter (1 set), Device that will be measured (1 set), Connector cables (1 set)
12.	DC Ampere meter and Volt meter	Determine the inner resistance of Ampere meter and Volt meter. Change the measurement span of Ampere meter and Volt meter. Measure Rx resistance.	DC Ampere meter and DC Miliampere meter (1 set), DC Volt meter and DC Miliampere meter (1 set), DC variable voltage generator, 5 decade resistance bar (1 set), Sliding resistance (1 set), Digital multimeter, Cables.
13.	AC Current	Determine and measure AC	DC and AC current generator (1

No.	Modules	Objective Usage	Facilities and Equipments
		current. Doing resonance experiment in AC current.	set), 4 decade resistance bar (1 set), Inductor (3 set), Capacitor bar (1 set), Digital multimeter, Signal generator, LCR meter (1 set).
14.	Microscope	Explain the working principle of microscope. Use microscope properly.	Microscope with objective lens and 2 ocular lenses, Objective microscope, Ocular microscope, Powder preparat, Wire/hair preparat, Numerical aperture meter, Calliper.
15.	Spectrometer	Explain the basic principle of spectrometer Prepare the spectrometer components for use. Read scale and nonius of the spectrometer Determine the refraction index of prism material using minimum deviation method. Determine the dispersion curve of material using prism spectrometer. Using dispersion curve to determine dispersion power of material, and length wave of light.	Spectrometer, Prism, Flashlight, Loupe, Hg and Na lamp.
16.	Wheatstone	Determine the electrical resistance using Wheatstone bridge method. Test the validity of electrical serial and parallel connection formula.	DC power supply, Rheostat resistance, Resistance bar, Unknown resistance, Galvanometer, Switch, Junction board, Wheatstone bridge device set, Connector cables.
17.	Sound wave resonance	Study the resonance phenomena in sound wave. Determine the velocity of sound wave in air Determine the vibration	Scaled resonance tube with reservoir, Some of tuning fork, frequency of one of them is known, Tuning fork beater, Calliper.

No.	Modules	Objective Usage	Facilities and Equipments
		frequency of tuning fork.	
18.	Magnetic field in solenoid	Determine the magnitude of magnetic field inside and outside of a solenoid. Determine the relation between magnetic field and electrical current. Determine the relation between magnetic field and solenoid winding number. Determine the permeability constant μ0	Personal computer and Logger Pro application program (1 set), LabPro interface (1 set), DC power supply- 5 A variables, 5 A Rheostat (1 set), Amperemeter (1 set), Magnetic field sensor (1 set), Solenoid (slinky) with holder (1 set), Connector cables.
19.	Lens characteristic and shadow effect	Determine the focus length of convex lens. Determine the focus length of concave lens. Know variety of shadow defect.	Strong convergent lens (++), Convergent lens (+), Divergent lens, Arrow objects, Bulb lamp, Screen to capture the shadow, Diaphragm, Optical desk, Connector cables and electrical voltage generator.
20.	LASER	Differentiate LASER from light. Recognize the physical phenomena in LASER: scattering, polarization diffraction, and refraction. Determine the refraction index of fluid and prism using LASER.	LASER source, Roll meter, Screen, Polarizer- analyzer, Lens, Prism, Lattice

Table C-2 to C-4 shows the modules, objectives, and major facilities for Electric Circuits Laboratory, Digital System and Microprocessor, and Electronics Laboratory for the second year students.

Table C – 2 . Electric Circuits Laboratory (EL2101)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Introducing Laboratory	Knowing the function of multimeter	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter,

No.	Modules	Objective Usage	Facilities and Equipments
	Instrument	Understanding the limit of measurement tool in DC current measurement Understanding the limit of measurement tool in DC and AC drop voltage in large resistance measurement Understanding the limit of measurement tool in AC voltage in high frequency and the sinusoidal waveshape measurement Understanding the difference in resistance measurement with 2 and 4 wires Can use oscilloscope	power supply. Toolkit, generator function, UPS,
2.	DC circuit and statistic resistance value	Understanding the use of Thevenin and Norton theorem Understanding superposition theorem Understanding Reciprocity theorem Be able to design voltage divider circuit Understand series and parallel resistor circuit Understand statistic resistance value	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS,
3.	Operational amplifier circuit	Be able to build a circuit in a breadboard Understanding the use of operational amplifier Be able to use standard operational amplifier circuit in simple analog computation circuit	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS,

No.	Modules	Objective Usage	Facilities and Equipments
4.	Transient phenomenon	Knowing natural response, forced response, and full response phenomenon from a circuit with power saving component in it Understanding and be able to count time constant in RC circuit from time response circuit Understanding the effect of free voltage source in the transient voltage value in Rc circuit	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS,
5.	AC circuit	Understanding the impedance concept physically Understanding the connection between resistance impedance and resistance in series RC and RL circuit Understanding the connection between voltage and current in series Rc and RL circuit Measure the phase voltage and current in series RC and RL circuit Understanding the response to the series RC and RL circuit frequency	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS,
6.	Resonance circuit	Knowing the characteristic of RLC circuit Knowing series resonance, parallel resonance, series parallel resonance Be able to distinguish the characteristic of series and parallel resonance Be able calculate and/or estimate the frequency of RLC	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS,

No.	Modules	Objective Usage	Facilities and Equipments
		resonance circuit	

Table C – 3 . Digital System and Microprocessor (EL2142)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Logic gate parameter	Knowing and understanding few characteristic of logic gate Knowing and understanding the parameters of logic gate Be able to make a simple combinational circuit using IC with CMOS logic	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS, Altera kit, Logic analyzer
2.	Introduction in design using FPGA	Studying designing technique on digital circuit with FPGA Be able to design a digital circuit with FPGA whether using schematic approach or VHDL language	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS, Altera kit, Logic analyzer, FPGA development kits
3.	Combinational Logic Gate	Designing simple circuit to see the effect of delay time Designing combinational circuit in the inform of decoder BCD-to-7-segment to be implemented in FPGA Using functional simulation to verify circuit function Using time analysis and simulation to identify worst case delay path Measure delay time propagation in the circuit Knowing abstraction in digital designing	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS, Altera kit, Logic analyzer
4.	Introduction to Arduino	Designing circuit for basic Arduino	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter,

No.	Modules	Objective Usage	Facilities and Equipments
		Designing circuit for many Arduino functions	power supply. Toolkit, generator function, UPS, Altera kit, Arduino kit
5.	Microprocessor Project	To implement and evaluate all the students knowledge	UPS, digital oscilloscope, analog oscilloscope, power supply, generator function, Arduino kit

Table C – 4 . Electronics Laboratory (EL2205)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Diode:Characteristic and application	Understanding characteristic of normal diode and Zener diode Understanding the use of diode in rectifier circuit Understanding the effect of simple filter in a DC source Understanding	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS
2.	Characteristic and BJT amplifier	Understanding characteristic of BJT transistor Understanding the bias technic with discrete circuit and constant current source Knowing and studying transistor function as amplifier Knowing characteristic common emitter, common base, and common collector configuration amplifier Knowing and studying input resistance, output resistance, and amplifier factor from each amplifier configuration	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS
3.	Characteristic and FET amplifier	Knowing and studying the characteristic of FET	PC unit, analog oscilloscope,digital oscilloscope, digital

No.	Modules	Objective Usage	Facilities and Equipments
		transistor Understanding the use if FET as amplifier to common source, common gate, and common drain configuration Understanding input resistance and output to the three configurations	multimeter, power supply. Toolkit, generator function, UPS
4.	Transistor as switch	Knowing and studying the function of transistor as switch Knowing and studying the working characteristic of BJT when operated as switch Knowing and studying the working characteristic of MOSFET transistor wheter in n-MOS type and CMOS when operated as switch	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS
5.	Output of power amplifier	Observing and knowing the classification of amplifier based on the sinusoidal function when the transistor conducted Measuring and analyzing distortion in the output stage amplifier class A, B, and AB Measuring and analyzing power and efficiency amplifier class A, B, and AB Observing, measuring, and analyzing simple thermal circuit for power transistor	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function, UPS
6.	Final project	Designing an amplifier based on the students comprehensive knowledge	PC unit, analog oscilloscope,digital oscilloscope, digital multimeter, power supply. Toolkit, generator function,

No.	Modules	Objective Usage	Facilities and Equipments
			UPS

Table C-5 to C-10 shows the modules, objectives, and major facilities for Electrical Power Laboratory I and II for the third year students.

Table C – 5 . Electrical Power Laboratory I – Control Systems (EP3171)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Modelling	Understand the modeling concept of DC motor control system	Modular Servo System MS-150, Multimeter, Oscilloscope/ XY recorder, jumper cables, stopwatch.
2.	Velocity Control Systems	Understand the concept of DC motor velocity control	Modular Servo System MS-150, Multimeter, Oscilloscope/ XY recorder, jumper cables, stopwatch.
3.	Position Control Systems	Understand the concept of DC motor position control system	DCMCT Quanser, Oscilloscope /XY recorder, AC adaptor, potensio/trimpot 10 kΩ, OpAmp LM741, resistor 10 kΩ, Resistor 1 kΩ, multimeter, jumper cables
4.	Matlab Introduction for System Design, Analysis, and Simulation	Able to conduct simulation and analyzing control system using Matlab software.	Computer with Matlab software
5	Implementation of DC Motor Control System using LabVIEW	Able to do controlling velocity and position of DC motor using LabVIEW software	DCMCT Quanser, AC adaptor, USB 6251+ Adaptor, SCB 68, RCA cables, 68 Pin cables, USB cable, Computer with LabVIEW software

Table C – 6 . Electrical Power Laboratory I – Power System Analysis (EP3171)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Preparation using PSSE	Knowing basic operations for using PSSE to do some studies in electrical power system	PC unit, PSSE Software

No.	Modules	Objective Usage	Facilities and Equipments
2.	Load flow analysis and contingency	Doing load flow study and contingency study in electrical power system using PSSE	PC unit, PSSE Software
3.	Short circuit and protection coordination analysis	Doing symmetrical and asymmetrical short circuit analysis and protection coordination analysis in electrical power system using PSSE	PC unit, PSSE Software
4.	Starting motor analysis	Doing starting motor analysis in electrical power system using PSSE	PC unit, PSSE Software
5.	Transient stability analysis	Doing transitional stability analysis in electrical power system using PSSE and understanding aspects and parameters that affect the system transitional stability	PC unit, PSSE Software

Table C – 7 . Electrical Power Laboratory I – Electrical Machinery (EP3171)

No.	Modules	Objective Usage	Facilities and Equipments
1	Transformer	Understand the characteristics of a single phase transformer and three-phase transformer (Δ and Y connection)	Power transformers, instrument transformers, voltmeter, ammeter, cables-connectors, oscilloscope, line source/power source, source switch and load switch.
2	DC Machine	Understand the restriction and characteristics of a shunt DC machine and separately excited DC machine as a motor or as a generator.	Ward-Leonard configuration of machines, voltmeter, ammeter, cables-connectors, line source/power source, source switch and load switch.
3	Synchronous Machine	Understand the characteristics and able to determine the equivalent circuit of synchronous generator Understand and be able to operate synchronous generator	Synchronous generator, voltmeter, ammeter, cables-connectors, line source/power source, source switch and load switch.

No.	Modules	Objective Usage	Facilities and Equipments
		in parallel generator mode	
4	Asynchronous Machine	Understand the characteristic and able to determine the equivalent circuit of Induction Machine Understanding the characteristic in starting of induction machine	Induction Motor, voltmeter, ammeter, cables-connectors, line source/power source, source switch and load switch.

Table C – 8 . Electrical Power Laboratory II – Power Electronics (EP3172)

No.	Modules	Objective Usage	Facilities and Equipments
1	Static Switches	Understand the characteristic of static switches Understand the use of static switches as AC voltage regulator	Static switches block (Thyristor, MOSFET, TRIAC), power supply block for static switches, ac voltage regulator, pulse generator block, resistive load, voltmeter, ammeter, oscilloscope, fuse, source switch and load switch.
2	AC-DC Converter/ Rectifier	Understand the principle of uncontrolled (diode bridge) rectifier circuit Understand the principle of semi-controlled (thyristor bridge) rectifier circuit	Diode bridge circuit, thyristor bridge circuit, voltmeter, ammeter, wattmeter, oscilloscope, RLC load.
3	DC-DC Converter	Understand the principle of DC-DC converter Understand the characteristics and use of Buck and Boost Circuit	DC-DC Converter block, Controller Block, Inductor-Capacitor Block, LEM Modul, Resistive Load, Oscilloscope, Voltmeter, Ammeter.
4	DC-AC Converter (Inverter)	Understand the principle of DC-AC converter (Inverter) Understand the characteristics and use of Push-Pull Inverter and Variable Speed Drive (VSD)	Induction Motor, Push-Pull Inverter, VSD Module, voltmeter, ammeter, cables-connectors, line source/power source, oscilloscope, Fluke View software.

Table C – 9 . Electrical Power Laboratory II - High Voltage Engineering (EP3172)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Generating high DC voltage	Knowing the way to generate high DC voltage Be able to analyze the multiplication of high voltage during transient condition	Lab. Computer, Matlab Simulink
2.	Generating high impulse voltage	Knowing the way to generate high impulse voltage Be able to determine the circuit parameters needed in generating high impulse voltage	Lab. Computer, Matlab Simulink
3.	Voltage distribution on chain insulator	Knowing the voltage distribution on chained insulators for high voltage transmission Knowing how to calculate the value of leakage capacitance of a leaked capacitor	Transformer, voltage regulator, multimeter, grounding stick, chain insulator, cable, conductor, insulator, control panel
4.	Gas breakdown	Knowing the mechanism of gas breakdown Knowing the effect of pressure and gap distance toward gas breakdown voltage Be able to draw Paschen curve	Ball electrodes, large resistor, transformer, multimeter, grounding stick, insulator, capacitor, compressor, voltage regulator, RC detector
5.	Partial Discharge	Understanding the principle of partial discharge test circuit Understanding parameters and characteristics of partial discharge	Ball electrodes, large resistor, transformer, multimeter, grounding stick, insulator, capacitor, compressor, voltage regulator, antenna censor, loop censor, RC detector, needle gap, HFCT, PC unit

Table C – 10 . Electrical Power Laboratory II – Power System Protection (EP3172)

No.	Modules	Objective Usage	Facilities and Equipments
1.	Three Phase Distribution Grid	Learning the basic protection circuit in three phase	Three phase board, AC source, DC source, reactor, time relay, overcurrent relay, lamps,

No.	Modules	Objective Usage	Facilities and Equipments
		distribution grid Making three phase distribution grid protection circuit Determine the settings, how the components (Circuit Breaker, Time Relay, and Current Relay) work, and protection indicator (bell and lamps) Apprehend short circuit that will be used in three phase distribution grid (phase-phase) and the disturbance they felt	transformer, ampere meter
2.	Overcurrent relay	Be able to draw time-current characteristic from overcurrent relay Be able to realizing overcurrent relay circuit in the grid Be able to determine the selective relay setting in protection coordination based on current and time variation	AC source, overcurrent relay, multimeter, large resistor, DC source, ampere meter, stop-watch

Table C-11 and C-12 shows area and complete list of equipments available in each laboratory used by EPE program.

Table C-11 . List of Equipments in Laboratories Used by EPE Program

Laboratory	Area (m^2)	Facilities & Equipments
Basic of Electrical Engineering	326	11 PCs, 18 oscilloscopes, 5 ADZS (blackfin), 1 equipment shelf, 13 desktop PC Dual Core E260, 11 education boards, 1 desktop PC Core 2 Duo E720, 16 Altera DE1, 1 measurement tool, 8 digital multimeters, 12 power supplies, 13 function generators, 1 toolkit, 1 desktop PC Core 2 Duo E7500, 3 LCD projector, 2 projector screen, 1 LCD monitor, 20 experimental kits, 3 blackfins, 30 desktop PCs Dual Core, 5 DSP board, 1 mounting, 1 multimeter, 2 computer, 4 LCR meter, 1 Wi-fi signal booster, 2 GB ethernet switch 16 ports, 9 DCA Pro, 9 semiconductor analyzers, 2 benchtop digital multimeters, 2 handheld digital multimeters, 1 DSLR camera, 1 folding ladder, 16 FPGA Development Board
Computer Systems & Control	317.8	1 duo mobile laptop, 1 laptop duo core T270, 6 UC Propeller experimental kits, 7 development kits, 1 desktop PC Core 2Quad, 12 desktop PCa Core 2 Duo E720, 6 power supply, 5 LCD projectora, 1 notebook, 4 projector screens, 2 starter kits, 1 desktop PC Core Duo E200, 7 Altera experimental kits, 1 XGA projector, 1 laptop/notebook Core 2 Duo SU9400, 1 wireless presenter, 1 measurement tool, 3 logic analyzers, 1 emulator, 1 SZ030-U00, 1 SZ130-U00, 3 digital signal processors, 2 laser pointers, 1 digital multimeter, 3 oscilloscopes, 8 DC motor control kits, 3 laptop / notebook Core 2 Duo T420, 1 thermal sensor, 8 smart sensors, 2 swarm robots, 2 server clusters, 1 air compressor, 1 GPS, 2 microphones, 1 emulator, 1 data acquisition platform for academic, 5 desktop PCs Core 2 Quad Q820, 2 data acquisition modules, 4 data acquisition module accessories, 1 DC motor, 2 system control instrumentation lab kits, 3 air conditioners, 2 mountings, 1 programmable power supply, 36 computers, 1 ScopeCorder, 1 telecommunication lab equipment, 4 Emona DATEx emona Board for ELVISI (1/278026-01), 2 high performance PCs, 31 all-in-one PCs, 1 XGA 1024x768 LCD Projector, 3 soldering stations, 2 mechanical tool kit, 1 KVM switch, 1 server storage (NAS), 2 digital microscopes, 5 handheld digital multimeters, 4 DC motor control boards, 5 modular engineering educational laboratory platforms, 2 DC power supplies, 4 analog computers, 4 communication system modules, 5 max termination type acquisition units, 4 data acquisition units, 1 laptop/notebook, 1 toolset kit, 2 CPU Core i3, 13 memory notebook RAM, 1 cutting machine motor/dynamo, 1 electrician tool set, 1 AC slide regulator, 1 office PC, 1 data acquisition recorder, 3 ampere pliers, 5 analog multimeter, 1 digital tachometer, 6 whiteboards, 1 meter roll, 1

Laboratory	Area (m^2)	Facilities & Equipments
		telephone, 1 engraver machine, 1 sound acquisition board, 1 laptop, 1 scanner, 1 webcam, 1 laser color printer, 2 wireless access points, 1 LAN tester, 5 hub switchs, 1 projector, 2 FPGA Starter Kits, 5 FPGA Development Boards, 1 lab kit, 2 software applications, 1 Digital XY Recorder, 2 Control System Instrumentation Lab KITs, 1 PeopleBot Platform, 2 Outdoor Robot Arm, 1 camera system, 1 Research patrol bot for human-interaction, 1 Inertial Measurement Unit, 6 3D Motion sensor, 3 vehicles
Electrical Energy Conversion	153.0	2 function generators, 2 combination optical tachometers/stroboscopes, 1 oscilloscope, 1 desktop PC Core 2 Duo E720, 9 IGBT modules, 2 pressure probes, 1 desktop PC Core 2 Duo E7500, 1 LCD projector, 1 projector screen, 1 digital signal processor, 1 emulator, 1 power quality analyzer, 6 clamps, 1 software application, 1 clamp / CD, 1 digital multimeter, 2 AC clamps on sensor, 1 tachometer, 1 digital power meter, 1 LCD projector, 1 electric car, 2 office PCs, 4 XGA 1024x768 LCD projectors, 1 management server, 8 current clamp probes, 1 A4 scanner, 1 sible step hydraulic lift, 1 meter roll
Power System & Electrical Distribution	45.0	1 desktop PC Dual Core E260, 12 desktop PC Core i3, 1 A3 printer, 1 wireless LAN, 1 management server, 1 laptop/notebook 13-14, 2 hub switchs, 1 CCTV camera packet with recorder, 1 UPS
High Voltage & High Current	316.0	1 electric drill, 3 electrical toolkits, 1 ring key, 1 desktop PC, 1 genset, 17 arresters, 3 grounding system, 1 UPS, 1 desktop PC Core 2 Duo E720, 1 tool kit, 1 electric stove, 1 digital camera, 3 hygrometers, 1 digital multimeter, 9 oscilloscopes, 1 compressor, 3 desktop PCs Core 2 Duo E7500, 3 LCR meter, 1 desktop PC Core 2 Duo E5400, 1 desktop PC Core i3, 5 high speed AD/DA cards, 5 microprocessor education boards, 2 transformers, 1 SLR camera + lens, 1 low voltage divider for impulse measurement, 1 low voltage divider for AC measurement, 1 low voltage divider for DC measurement, 1 desktop PC Core i3, 1 data acquisition module, 2 electromagnetic field testers, 1 macro camera lens, 1 laser meter, 1 light meter, 4 desktop computers, 1 PC workstation, 2 insulation testers, 1 wireless router, 1 notebook, 1 dielectric tester, 2 earth testers, 1 electric welding, 4 hub switchs, 2 laptops/notebooks13-14, 1 tool set, 1 digital milli gauss meter, 2 laptops/notebooks 10-12, 2 voltage test electrode chambers, 1 ELF survey meter, 1 partial discharge calibration, 1 UTP cable tester, 1 all-in-one PC, 1 digital storage oscilloscope, 1 drilling machine and screwdriver, 2 LED spotlights, 1 router, 4 handheld digital multimeters, 1 stopwatch, 5 digital

Laboratory	Area (m^2)	Facilities & Equipments
		temperature, 1 server storage (NAS), 1 milling drilling machine, 1 PC, 1 digital tachometer, 1 LAN tester, 1 takel, 1 wind compressor, 1 high performance PC, 1 LCD projector, 1 dig micrometer, 1 100 MHz arbitrary waveform generator

Table C - 12. Detailed Specification and Quantity of Each Equipments in Laboratories

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
1	Personal Computer	AMD sempron 3200 (socket AM2,elite nforce 4 M-A (AM2,Nforce 4),HIS 9200 128 MB (PCI express),maxtor 80 GB ATA 7200 rpm,DDR1 512 GB PC 3200,LCD 17 inch LG,keyboard+mouse optic black genius,casing simbada ATX 400 watt	11 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2008
2	Osolloscope	GOOD WILL.,Analog Osolloscope,50MHZ.Type:GOS-6050	3 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2008
3	Osolloscope	GOOD WILL.,Analog Osolloscope,50MHZ.Type:GOS-6051	2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2008
4	ADZS (Balckfin)	ADI p/n : ADZS-BF561-EZLITE	5 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2008

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
5	Education Board	ALTERA, Type : UP2	11 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2008
6	Development Kit	Propeller rapid Dev.kit	1 Unit	Mechanical Laboratory	Computer Systems & Control	2008
7	Development Kit	Development kit, rabbit semi conductor,rabbit ram 370	1 Unit	Mechanical Laboratory	Computer Systems & Control	2008
8	Development Kit	Development kit, rabbit semi conductor,rabbit ram 370	2 Unit	Mechanical Laboratory	Computer Systems & Control	2008
9	Development Kit	Development kit, rabbit semi conductor,rabbit ram 5400W	1 Unit	Mechanical Laboratory	Computer Systems & Control	2008
10	Development Kit	Development kit, rabbit semi conductor,rabbit ram 5400W	2 Unit	Mechanical Laboratory	Computer Systems & Control	2008
11	FPGA Development Board	Elpid Programrable gate array eduction board altera DE1	16 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2009
12	Digital multimeter	Agilent HP-34410A	2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2009

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
13	Power supply	DC Power suplly,Goodwill/gps-3030d	4 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2009
14	Function generator	Instek SFG2110	5 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2009
15	Starter kit	TEXAS Instruments (TI) TMS320C6713 DSP Starter Kit (DSK) P/N : TMDSDSK6713	2 Unit	Java Competency Center	Computer Systems & Control	2009
16	FPGA Starter Kit	Cyclone III FPGA Starter Kit	2 Unit	Mechanical Laboratory	Computer Systems & Control	2009
17	Logic analyzer	Lesptronix LA-2026	3 Unit	Java Competency Center	Computer Systems & Control	2009
18	FPGA Development Board	Altera DE2 powerful cylone TM II FPGA and rich I/O support	5 Unit	Mechanical Laboratory	Computer Systems & Control	2009
19	Swarm Robot	60MIPS ARM7TDMI 32-bit processor, Digital video camera with resolution from 80x64 to 640x480 pixels,Infrared sensors, Wifi wireless communications on a dual-motor tracked mobile robotic base, Drive system using precision gear motors and urethane tank treads, 7.2V 2AH Li-ion battery pack, providing operation in excess	2 Unit	Mechanical Laboratory	Computer Systems & Control	2009

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		of 4 hours on a single charge(depending on usage), Charger for 110-20VAC/50-60Hz Power Supply, PC Side USB ZigBee RF Module, Sample Source Code Provided				
20	Propeller uC Development Kit	HYDRA Development Kit	5 Unit	Mechanical Laboratory	Computer Systems & Control	2009
21	Smart sensors	Smart sensors & application kit parallax #28029)	7 Unit	Mechanical Laboratory	Computer Systems & Control	2009
22	DC Motor Control Kit	Quanser engeneering trainer (QET) DC motor control……	2 Unit	Java Competency Center	Computer Systems & Control	2010
23	DC Motor Control Kit	Quanser QNET-010 DC Motor Control	1 Unit	Final Project Room	Computer Systems & Control	2010
24	Data Acquisition Module	PC Data Acquisition Card & Acessories ; NI PCI-6221 ; 16 Analog Inputs, 24 digital I/O, 2 analog outputs	2 Unit	Final Project Room	Computer Systems & Control	2010
25	Data Acquisition Module Accesories	NI SHC68-68-EPM Shielded Cable, 68-D-Type to 68 VHDCI offset, 2m	2 Unit	Final Project Room	Computer Systems & Control	2010
26	Lab Kit	DSPACE Advanced control education kit ACE1104CP,MPC8240 processor 32MB SDRM 4 general purpose timers,counter interrupt controller 4 multiplexed A/D converter 16 bit,2 micro-second conversion time 4 parallel A/D converter 12 bit, 800 nano-second conversion time,8	1 Unit	Lecture Room	Computer Systems & Control	2010

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		D/A converter 16 bit,20 bit digital I/O digital increment encoder serial interface Siava DSP host interface complete sofware for developer with GUI sofware (control Desk,RTI,MLIB/MTRACE) and compller for power PC Connector panel for access of all I/O channels				
27	Data Acquisition Module Accesories	NI SCB-68 Noise Rejecting, Shielded I/O Connector Block-screw terminal	2 Unit	Final Project Room	Computer Systems & Control	2010
28	Software Application	LabVIEW (Full) Development System NI Academic Site Licanse-Departement Teaching for 30 Licence includes 1 year standard service	1 Unit	Lecture Room	Computer Systems & Control	2010
29	DC Motor		1 Unit	Final Project Room	Computer Systems & Control	2010
30	Lab Kit	Acrylic + Komponen	20 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2011
31	Funcition Generator	Instek SFG2110 10MHZ Type:DDS; Bandwidth:10MHz; Modulation Type:AM, FM; Sweep Rate Range:100:1 lin/log	8 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2011

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
32	Blackfin	Crosscore Dev. Tools ADZS-BF561-EZELITE	2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2011
33	Power Supply	DC Power Supply, Goodwill/gps-3030d	8 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2011
34	Blackfin	Crosscore Dev. Tools ADZS-BF561-EZELITE	3 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2011
35	Oscilloscope	GW Instek GDS-806S	4 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2011
36	Software Application	MATLAB Academic Special 2010 Offer: 30+1 perpetual licenses of (MATLAB, SIMULINK, Control System Toolbox, Signal Processing Toolbox, Communication Toolbox)	1 Unit	Lecture Room	Computer Systems & Control	2011
37	Digital XY Recorder	Yokogawa SL1400 scopecorder LITE (70124-F-J3-HE) plug-in module type chart recorder with a lange bullt-in A4 sized high resolition thermal printer accessorles: (a) Hi-speed 1 MSPS 12 bit isolation module (b) safety BNC adapter lead © safty llgator-clip (dolphin type) (d) safty mini-clip (Hock type)	1 Unit	Lecture Room	Computer Systems & Control	2011

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
38	Control System Instrumentation Lab KIT	FeedBaack TK4941L Photoconductive cell, photo diode phototransistor	1 Unit	Mechanical Laboratory	Computer Systems & Control	2011
39	Control System Instrumentation Lab KIT	FeedBaack TK2941E Linear variable resistor, Variable area capacitor, Variable distance Capacitor, Variable inductor, LVDT, Strain gauge	1 Unit	Mechanical Laboratory	Computer Systems & Control	2011
40	PeopleBot Platform	PC PeopleBot Platform with Gripper Brand & PN : MobileRobots (PEOL003) Differential-drive robot for service and human-robot interaction (HRI) projects. PeopleBot is built on the robust P3-DX base, with a chest-level extension to facilitate interaction with people. Fully assembled with motors with 500-tick encoders, 19cm wheels, tough aluminum body, 8 forward-facing ultrasonic (sonar) sensors, 8 optional real-facing sonar, 1, 2 or 3 hot-swappable batteries, The PeopleBot base platform with included software has the ability to: BE DRIVEN with keys or joystick AUTONOMOUSLY PLAN PATHS AND AUTOMATICALLY NAVIGATE on its own DISPLAY a map of its sonar readings LOCALIZE using sonar COMMUNICATE SENSOR & CONTROL information relating sonar, motor encoder, motor controls, user I/O, and battery charge data RUN C/C++ QUICKLY	1 Unit	Class Room	Computer Systems & Control	2011

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		SIMULATE BEHAVIORS OFFLINE with the simulator that accompanies each development environment				
41	Outdoor Robot Arm	Manipulator A. Outdoor Robot Arm (Viper) Brand & PN : Mobile Robots (s850) Spesification : - Smart Controller CX - MB60R - Front Panel - Power and Signal cables - Power I/O connector AdeptWindows - NFS client – Documentation	1 Unit	Class Room	Computer Systems & Control	2011
42	Outdoor robot platform	Seekur Jr Robot Base Brand & PN : MobileRobots (SKR0100) Seekur Jr is a skid steer, all-weather robot platform for research, security and inspection use Robot Specification : DIMENSIONS: 105mm x 840mm x 500mm LxWxH WEIGHT: 77kg (1 battery) GROUND CLEARANCE: 105mm TIRES: 400mm WHEELBASE: 425mm BODY: Lightweight aluminum all-weather unibody IP RATING: 54 TEMPERATURE RATING: ?5?C-+35?C standard operation ENERGY STORAGE: 24 V NiMH battery (up to 3) RUN TIME: 3+ hr in continuous motion PAYLOAD: 50kg NAVIGATION & MOTION STEERING & SUSPENSION: 4 wheel skid steering MAXIMUM SPEED: expected 1.2 meters/second TERRAIN: Pavement, grass, snow, and dirt terrain	1 Unit	Class Room	Computer Systems & Control	2011

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		SLOPE: Greater 75% grade capability TYPES: Guarded tele-operation, manual remote or manual direct drive, plus autonomous operation options Include : Battery for Seekur Jr NIMH (ACT0370) LCD Display for Seekur Jr (ACA0600) Outdoor navigation system for seekur Jr. Including LMS11 laser, IMU and 2M GPS Plus MobileRobots Outdoor navigation software, Requires onboard PC (ACT0460) Extra swappable battery set NIMH 24V (ACT0475)				
43	Camera systems	Outdoor westherzed PTZ camera brand & PN:mobile robots (ACT0320)Spesification outdoor PTZ camera for seekur and seekur	1 Unit	Class Room	Computer Systems & Control	2011
44	Research patrol bot for human-interaction	Research 3D MobileRanger C3D Map/VSLAM/Percep PatrolBot Brand & PN : MobileRobots (PAT0100) Differential-drive robot designed for research projects that require reliable, continuous 24X7 use or a mid-size payload The base PatrolBot can travel at speeds up to 2 m/s, and can carry up to 40kg over flat surfaces The PatrolBot is an all-purpose indoor base, ideal for research and applications including -mapping -teleoperation -localization -monitoring -reconnaissance -vision -manipulation	1 Unit	Class Room	Computer Systems & Control	2011

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
45	Inertial Measurement Unit	Inertial Measurement Unit Brand & PN : Mobile Robots (ACT0310) Spesification For Seekur and Seekur Jr. It is an advance IMU inertial Measurement Unit for even greater accuracy	1 Unit	Class Room	Computer Systems & Control	2011
46	Personal Computer	Assemblies,Desktop computer Proc Intel dual core 5700 Mb Gigabyte GA-HG1M-DS2 Memory visipro 1/10600 HD wdc 500 GB sata RAM 2GB DVDRW tray 24x casing simbada Sim-x monitor Lcd 18,5 inch keyboard & optical mouse USB	30 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2012
47	3D Motion sensor	Microsoft kinect motion sensor for Xbox 360	6 Unit	Administration Office	Computer Systems & Control	2012
48	DSP Board	ADSP-BF561 Evaluation Kit ADSP-BF561 Blackfin Processor, 64 MB SDRAM, 8 MB Flash Memory	5 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
49	Oscilloscope	GW instek GDS-1152A-UI	5 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
50	Oscilloscope	Merk GW Instek type GDS 3354 350MHz,4 chanel,color LCD display DSO 350/250/150MHz with 2/4 channels 5GSa/s	1 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
51	Multimeter	Merk FLUKE type fluke 289 fitur DC volts 50.000mV,500.00 mV,5.0000V,50.000V,Accuracy 0.025 % AC volts 500.00V,1000.0V…	1 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
52	Personal Computer	PC Lenovo AIO M72,IntelCi3-3240.3 4Ghz,3M cache,2GB SODIMM DDR3,harddisk 500GB 7200 rpm,monitor 20"	2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
53	LCR meter	GW instek LCR 817+RS232,12Hz-10kHz (489 steps)	2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
54	Oscilloscope	GW Instek GDS-1152A-U I,150 MHz	3 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
55	LCR Meter		2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2013
56	DC Motor Control Kit	Quanser Engineering Trainer (QET) DC Motor Control. Motor: Torque constant 0.0502 N.m/A , Terminal resistance 10.6 ohm , Terminal inductance 0.82 mH, Rotor inertia 11.6 g.cm2, Peak Torque 0.07 N.m. ; Linear Amplifier: Gain 3.0 V/V, Maximun output voltage 15 V, Maximun output current 1.5 A, Maximun output power 22W,	4 Unit	Final Project Room	Computer Systems & Control	2013

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		Maximum dissipated power (with heat sink) Rload=4ohm 8W ; Current Sense: Current calibration (+10%) 0.556 A/V ; Encoder: Line count 1024 lines/rev, Resolution - Quadrature 0.0879 deg/count ; Type: TTL ; Signals: A, B, Index ; Potentiometer: Resistance 10 kOhm , Bias voltage + 4.7 V , Electrical range 350 degrees, Calibration 39 deg/rev ; Tachometer (Analog output- Digitally Derived From Encoder: Calibration 667 RPM/V).				
57	Vehicle	KIA All New Picanto SE 3 Type M/T 1.25 Spesification : Stylish alloy wheel,Electric folding mirror,grip-type outside door handle,black bezel head lamp,sporty fog lamp,stand out rear lamp,	1 Unit	Administration Office	Computer Systems & Control	2013
58	Vehicle	KIA All New Picanto SE 3 Type M/T 1.25 Spesification : Stylish alloy wheel,Electric folding mirror,grip-type outside door handle,black bezel head lamp,sporty fog lamp,stand out rear lamp,	1 Unit	Administration Office	Computer Systems & Control	2013
59	Vehicle	KIA All New Picanto SE 3 Type M/T 1.25 Spesification : Stylish alloy wheel,Electric folding mirror,grip-type outside door handle,black bezel head lamp,sporty fog lamp,stand out rear lamp,	1 Unit	Administration Office	Computer Systems & Control	2013

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
60	Programmable power supply	Merk GW Instek type APS 1102 not only in the role as precision AC/DC power supply but also a powerful analyzer….	1 Unit	Mechanical Laboratory	Computer Systems & Control	2013
61	Personal Computer	PC Lenovo AIO M72,IntelCi3-3240.3 4Ghz,3M cache,2GB SODIMM DDR3,harddisk 500GB 7200 rpm,monitor 20"……	1 Unit	Administration Office	Computer Systems & Control	2013
62	Personal Computer	PC Lenovo AIO M72,IntelCi3-3240.3 4Ghz,3M cache,2GB SODIMM DDR3,harddisk 500GB 7200 rpm,monitor 20"……	31 Unit	Computer Laboratory	Computer Systems & Control	2013
63	ScopeCorder	DL850+Accassories,high-speed up to 100 MS/s,high resolution up to 16-bit….	1 Unit	Final Project Room	Computer Systems & Control	2013
64	Semiconductor analyzer	Advanced semiconductor analysis with curve traning	9 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2014
65	Semiconductor analyzer	DCA75, Bipolar transistor output characteristics, IC vs VCE. Bipolar, transistor gain characteristics, HFE vs VCE. Bipolar transistor gain characteristics, HFE vs IC. MOSFET and IGBT output , function, ID vs VDS. MOSFET and IGBT transfer function, ID vs VGS. JFET output function, ID vs VDS. JFET transfer function, ID vs VGS. Voltage regulator, VOUT vs VIN.	2 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2014

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		Voltage regulator, IQ vs VIN. PN junction I/V curves, forward and reverse options				
66	Benchtop Digital Multimeter	Type : DM3058E Umum : True 5 ?? digit resolution (240,000 counts) 123 Readings/second maximum reading rate 0.015% DC Voltage Accuracy USB and RS-232, and LXI-C (Ethernet) Connectivity SCPI Command Compatibility Available datalogging and sensor connectivity Kemampuan Ukur : DC Voltage: 200 mV - 1000 V Accuracy 0.015 + 0.003, DC Current 200 uA - 10 A Accuracy 0.055+0.005 AC Voltage (RMS) 200 mV - 750 V, Freq 20 Hz - 100 kHz, Acuracy 0.20 + 0.05 AC Current (RMS) 20 mA - 10 A, Freq 20 Hz - 10 kHz Acuracy 30+0.10 Resistance(2-wire and 4-wire) 200 ?? - 100 M?? Acuracy 0.020 + 0.003 Capacitance 2 nF - 10000 uF Acuracy 1 + 0.5 Diode 2.4V, Range Test 1 mA, Accuracy 0.05 + 0.01 Continuity 2 k?? Range test 1 mA, Accuracy 0.05 + 0.01 Frequency and Period 200 mV - 750 V, Fraq 20 Hz - 1 MHz, Accuracy 0.01+0.003 12	3 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2014

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
67	Handhald Digital Multimeter	Type : CD800a Handheld Digital Mmultimeter, 3-3 / 4 digits 4000 count 0.7% best accuracy Capacitance measurement Not suitable for measuring condensers with large leak current Frequency measurement (AC sine wave only) Data hold / Range hold Relative value Auto power off (30min.) (cancelable) Low power ohm (input voltage 0.4V) at continuity range Solid & protective body cover that can also be used as a tilt stand Chip holder behind the body cover Display : numeral display 4000 Sampling rate : 3 times / sec. AC frequency bandwidth 45-500Hz (4V range) 45-1KHz (40V range and above)	9 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2014
68	Telecomunication Lab Equipment	Internasional Branded : (780296-01)Emona DATEx Telecommunication Board for ELVISI,1/2(780296-01) National instruments DAQ 6251 M part No.779694-06 All-in One PC Core I3	1 Unit	Mechanical Laboratory	Computer Systems & Control	2014
69	Emona DATEx Telecommunication Board for ELVISI,1/2(780296-01)	(780296-01)Emona DATEx Telecommunication Board for ELVISI,1/2(780296-01)	4 Unit	TA	Computer Systems & Control	2014

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
70	All-in One PC	HP Pavilion 20-a2100 Intel core i3-3240 2GB DDR3,500GB HDD 7200 rpm,DVDRW,VGA intel HD Graphis,NIC,WIFI,Bluetooth,camera,20"TFT,panel,Win8 64 bit	4 Unit	TA S1/Praktikum	Computer Systems & Control	2014
71	Soldering Station	HAKKO FX-951,Voltage (AC) 230 V,input fuse 1A,output poak power 130 W/23.5V,temperatur selection 90-450 C/190-840 F…	3 Unit	Mechanical Laboratory	Computer Systems & Control	2014
72	Server Storage (NAS)	WESTERN DIGITAL Sentinel DX4000 12TB [WDBLGT0120KBK]	1 Unit	Mechanical Laboratory	Computer Systems & Control	2014
73	Digital Microscope	DINO-LITE AM4113TL-M4C	2 Unit	Mechanical Laboratory	Computer Systems & Control	2014
74	Handhald Digital Multimeter	Type : CD800a, Handheld Digital Mmultimeter, 3-3 / 4 digits 4000 count 0.7% best accuracy Capacitance measurement Not suitable for measuring condensers with large leak current Frequency measurement (AC sine wave only) Data hold / Range hold Relative value Auto power off (30min.) (cancelable) Low power ohm (input voltage 0.4V) at continuity range Solid & protective body cover that can also be used as a tilt stand Chip holder behind the body cover Display : numeral display 4000 Sampling rate : 3 times / sec. AC frequency bandwidth 45-	3 Unit	Mechanical Laboratory	Computer Systems & Control	2014

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
		500Hz (4V range) 45-1KHz (40V range and above)				
75	DC Motor Control Kit	QNET DC Motor Control Board part number: 780293-01 Compatible with NI ELVIS Illustrate the fundamentals of DC control by configuring position, speed, and parameter estimation Build intuition by taking models from simulation to implementation using one software platform Save time with comprehensive curriculum that enables a deep understanding of engineering principles	4 Unit	Final Project Room	Computer Systems & Control	2014
76	Modular Engineering Educational Laboratory Platform	NI ELVIS II+ hardware (For Academic Use Only) (780381-02) Fitur : Integrated suite of 12 instruments Built in 100 MS/s oscilloscope option Hi-Speed USB plug-and-play connectivity Complete integration with NI Multisim for teaching circuits concepts Extend your lab with companion products from Quanser, Freescale, Emona, and more Free courseware for download 12	5 Unit	Final Project Room	Computer Systems & Control	2014

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
77	DC Power Supply	GW Instek SPS-3610	2 Unit	Advance Robotic	Computer Systems & Control	2014
78	Oscilloscope	GW Instek GDS-1152AU	1 Unit	Advance Robotic	Computer Systems & Control	2014
79	Analog Computer	TESCA 38689	4 Unit	Final Project Room	Computer Systems & Control	2015
80	Comunication System Module	National instruments emona DATEX telecommunication board for ELVIS (board only) (780296-01)	4 Unit	Computer Laboratory	Computer Systems & Control	2015
81	Data Acquisition Unit	National instruments DAQ 6251 M part No.779694-06	5 Unit	Computer Laboratory	Computer Systems & Control	2015
82	Data Acquisition Unit	National instruments NI DAQ USB-6351 x part no.781440-01	4 Unit	Computer Laboratory	Computer Systems & Control	2015
83	AC Slide Regulator	TDGC2 2000V	1 Unit	Mechanical Laboratory	Computer Systems & Control	2015
84	Digital XY Recorder	Yokogawa,ScopeCorder (DL850E)	1 Unit	Mechanical Laboratory	Computer Systems & Control	2015
85	Semiconductur Analyzer	Atlas DCA Pro Advanced Semiconductur Analyzer (DCA75)	7 Unit	Basic of Electrical Engineering Laboratory	Basic of Electrical Engineering Laboratory	2016

No.	Items	Specification	Quantity	Room	Laboratory	Receipt Year
86	Engraver Machine	Acrylic TYPE AS-6040, Baisheng	1 Unit	Mechanical Laboratory	Computer Systems & Control	2016

APPENDIX D – INSTITUTIONAL SUMMARY

A. The Institution

1. Name and Address of the Institution

Institut Teknologi Bandung

Jalan Ganesha 10

Bandung 4013

Indonesia

2. Name and Title of the Chief Executive Officer of the Institution

Prof. Dr. Kadarsyah Suryadi

Rector of Institut Teknologi Bandung

B. Type of Control

The Institut Teknologi Bandung is a public university supported by the government of Republic Indonesia. The Insitut Teknologi Bandung is governed by the Ministry of Education. The university has its own Board of Trustee which includes representative of central and local government, faculty members, staff members, students, alumni, and public. The rector of the university reports to the Board of Trustee.

C. History of Institution

Institut Teknologi Bandung (ITB) or Bandung Insitute of Technology or Institute of technology Bandung, was founded on March 2, 1959. The present ITB main campus is the site of earlier engineering schools in Indonesia. Although these institutions of higher learning had their own individual characteristics and missions, they left influence on developments leading to the establishment of ITB.

In 1920, Technische Hogeschool (TH) was established in Bandung, which for a short time, in the middle forties, became Kogyo Daigaku. Not long after the birth of the Republic of Indonesia in 1945, the campus housed the Technical Faculty (including a Fine Arts Department) of Universitas Indonesia, with the head office in Jakarta. In the early fifties, a. Faculty of Mathematics and Natural Sciences, also part of Universitas Indonesia, was established on the campus.

In 1959, the present lnstitut Teknologi Bandung was founded by the Indonesian government as an institution of higher learning of science, technology, and fine arts, with a mission of education, research, and service to the community.

Government Decree No. 155/2000 pertaining to The Decision on ITB as Legal Enterprise (Badan Hukum) has opened a new path for ITB to become autonomous. The status of autonomy implies a freedom for the institution to manage its own business in an effective and efficient way, and to be fully responsible for the planning and

implementation of all program and activity, and the quality control for the attainment of its institutional objective. The institution has also freedom in deciding their measures and taking calculated risks in facing tight competition and intense pressures.

D. Student Body

At the end of second semester of 2015/2016 academic year, ITB had a total enrollment of 20,930 full time students with no part-time student. All the students enrolled in the main ITB campus. The student body consists of 14,445 undergraduate students, 5,650 master students, and 835 PhD.

E. Regional or Institutional Accreditation

Institut Teknologi Bandung is accredited by Higher Education - National Accreditation Board (Badan Akreditasi Nasional – Perguruan Tinggi, BAN-PT) in 2008. This accreditation is newly introduced in Indonesia and ITB is the first institution to receive the highest rank of accreditation type. All of the study program within ITB must be accredited by BAN-PT.

Currently out of 37 undergraduate programs, 29 undergraduate study programs are accredited with the highest rank (A) of accreditation type (excellent), 1 undergraduate study program received good (B) accreditation type, and the rest 7 undergraduate programs are newly established study programs and have not received any accreditation.

F. Personnel and Policies

1. THE PROMOTION AND TENURE SYSTEM

Recruitment of faculty member is centrally administered by the university. Following Indonesian government schedule, the university has a yearly recruitment activity of academic staff for all study programs within the university. In this case, most faculty members are formally recruited as government officials of the Ministry of National Education. In the past, the university had mostly recruited academic staff for Lecturer position, which is the lowest academic career among other three in higher order, i.e. Assistant Professor, Associate Professor, and Professor. However, the university's Board of Trustee has recently requires the university to recruit an academic staff to fill Assistant Professor's position. The candidate of the position has already hold doctoral degree or at least is expected to have the degree soon.

Although the university usually imposes a quota of vacant academic position for every school or faculty, the actual needs are proposed by the school's dean. To conform the EPE requirement, the dean's proposal originates from the head of EPE program that shall also be approved by the chairman of a research group, which is a formal affiliation of every academic staff of the university. Each faculty member who serves EPE program has to be affiliated with one of 9 (nine) research groups in the school, i.e. computer engineering, control & computer systems, electronics, biomedical engineering, information technology, electrical power engineering, telecommunications, software & data engineering, and informatics. At the beginning of the semester each faculty

members has to make a written activity plan that covers teaching to research activities, which is called Formulir Rencana Kegiatan (FRK). At the end of the semester, the so called Formulir Evaluasi Diri (FED) is completed instead. The performance of each faculty members is then evaluated by the chairman of the research group, then by the dean of the school, and by the university.

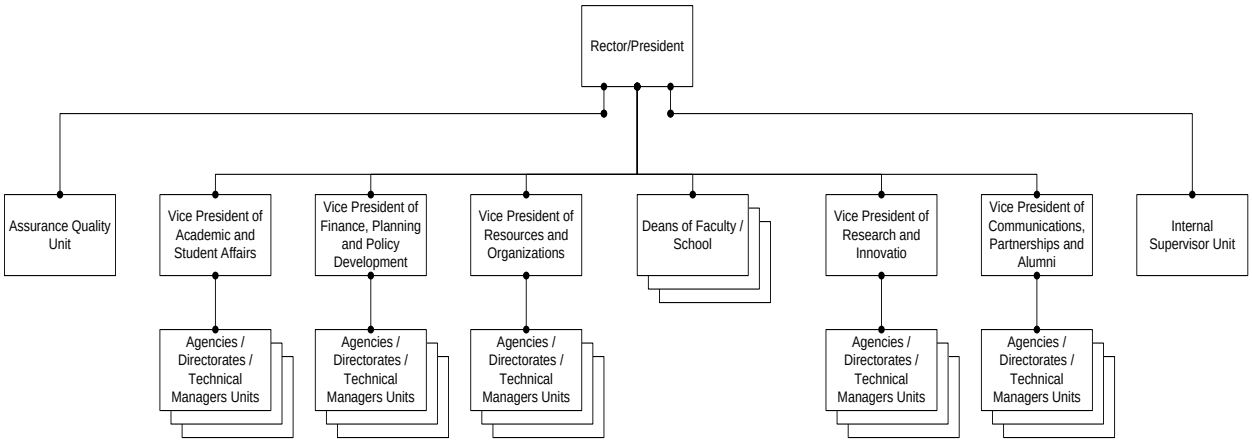
2. THE PROCESS USED TO DETERMINE FACULTY SALARIES

As government officials, the faculty member basic salaries are in accordance to the government's standard in the Ministry of national Education and dependent on the academic career level. Additional salaries are calculated by the university based on the performance and load of work of the faculty in teaching and his/her involvement in related university's approved activities, e.g. as committee member or performing organizational tasks. The university has a comparable salary scheme for the faculties who are not government officials. Some additional fund may be obtained if the faculties are involved in funded research programs.

3. FACULTY BENEFITS

All faculty members have health insurance benefits including the spouse and at most two children. The benefits cover in-bed hospitalization and in-hospital natal cares.

G. Educational Unit



H. Academic Support Units

Based on the curriculum explained in criterion 5, Electrical Power Engineering program required some courses in category of basic sciences & mathematics, and general educations.

Courses in basic sciences & mathematics are taught by appropriate faculty members of Faculty of Mathematics and Basic Sciences (FMIPA). For instance, MA1101 Calculus IA, MA1201 Calculus IIA, MA2072 Engineering Mathematics I, and MA2074 Engineering Mathematics II are taught by faculty members of Mathematics Study Program of FMIPA; FI1101 Physics IA, and FI1201 Physics IIA are taught by faculty members of Physics

Study Program of FMIPA; KI1101 Basic Chemistry IA, and KI1201 Basic Chemistry IIA are taught by faculty members of Chemistry Study Program of FMIPA.

Similar to the courses in basic science & mathematics, the elective courses in general education such as Religion, Industrial Management, and Environmental Education are also taught by the appropriate faculty staff. Industrial management course is taught by Industrial Engineering study program of Industrial Technological Faculty, Environmental Education course is taught by the Environmental Study Program of Civil Engineering & Environmental Faculty.

The name of the respective faculty members who taught the above courses are assigned by the appropriate Dean of Faculty.

The complete list of all the above courses could be seen at http://akademik.itb.ac.id

I. Non-Academic Support Units

CANTEEN

There are 8 canteens at ITB: 4 managed by Dharma Wanita, 1 managed by Barrac, 1 managed by Kokesma, 1 Kantin Timur and 1 Kantin Pusat.

CENTER OF CAMPUS INFORMATION SERVICES

This center is located at the main gate of ITB Campus. Visitors can get information they need regarding ITB in general and its campus from this center.

CHILD CARE BUNDA GANESA

ITB provides child care services to help working parents. It accommodates 30 children ages 3 months to 5 years. It opens every working day from 07.00 to 17.00. It has indoor and outdoor play grounds, sleeping rooms, and classroom. It also provides pediatrician, psychologist, nutritionist, and educator.

FAMILY HEALTH CENTER

The Family Health Center gives services: general clinic, dental clinic, Family Planning, ECG, internist, eye doctor, pediatrician, laboratory, and first aids.

GUIDANCE AND COUNSELING

Guidance and Counseling is a place where the students can ask for help in solving their non academic problems. It is supported by psychologists and certified teaching staffs as counselors.

INFORMATION TECHNOLOGY FACILITIES

All buildings at ITB are connected to fiber optic network and internet. There is a computing center for Common Preparatory Level students with 140 computers.

LANGUAGE CENTRE

The Language Center offers services:

a) English, Japanese, German and Chinese courses
b) Translation
c) TOEFL-like Test
d) Language Consultant
e) Language Training for English Teachers
f) Indonesia Course for Expatriates

LIBRARY

The library provides information services to ITB and society. It has about 291.400 book titles and 9.113 magazines collections. The services include lending books, audio visual, ordering copy from other libraries in Indonesia and overseas, and internet services.

PUBLISHER

ITB publisher is an auxiliary business in the area of printing and publishing books and literatures. This unit gives support to academic program such as giving the opportunity for ITB lecturers to publish their books, lecture notes and publishing foreign literatures in Indonesian.

SASANA BUDAYA GANESA BUILDING

Sasana Budaya Ganesa is the center for science, technology and art. It has modern facilities to support the academic activities and others such as conferences, symposiums, exhibitions, music concerts, and dance performances. The facilities include a big hall that can accommodate 4.000 people, audio visual room, restaurant, meeting rooms, science and technology gallery, library for special collections, etc.

SAWUNGGALING HOTEL

Sawunggaling Hotel provides services to ITB guests and alumni. It has 17 rooms (4 Executive Rooms, 12 Standard Rooms, and 1 Standard Comer), 1 meeting Room for 15, Business Center, Art Gallery and Café.

SPORT CENTER

The Sport Center has Olympic-size swimming pool, kids swimming pool, diving pool, football field, basketball fields, volleyball fields, tennis courts, jogging track and fitness centre. The facilities are mostly used for sport courses in the Common Preparatory Level. The facilities are also used for other activities such as football school, tennis lesson, jogging club, swimming lesson, and other programs.

STUDENT DORMITORY

ITB provides 7 buildings for male dormitory and 1 building for female dormitory. The dormitory accommodates 294 students in total, 245 male students and 49 female students. The permission to stay in the dormitory is one year and can be extended if the requirement fulfilled.

For a more complete lists and information can be found in http://www.itb.ac.id/en/about-itb/facilities/list.

J. Credit Unit

One semester represents one class hour or three laboratory hours per week. One academic year normally represents at least 30 weeks of classes, exclusive of final examinations.

ITB define one academic year is equivalent to either 36 semester hours or the quotient of the number of credits required for graduation divided by the nominal length of the program in years, whichever is less. Thus, for programs with 144 semester hours or greater, one year is 36 semester hours.

K. Instructional Modes

N/A

L. Grade-Point Average

There are two levels of undergraduate program. The first level is called the first common year (Tahap Pertama Bersama), and the second one is Bachelor level (the second till the final years).

The students are graduation if they are satisfied the following criteria:

1. The students pass the first common year (36 credit hours courses) with the minimum GPA of 2.0 out-of 4.0 within 2 years.
2. The students pass the Bachelor level (minimum 108 credit hours courses) with the minimum GPA of 2.0 out-of 4.0 within 6 years (7 years before 2004) including the first common year.

In the first common year, students from the same school/faculty have the same 36 credit hours of courses. The students must pass all the courses within 2 semester (1 year) with minimum grade-point average of 2.0 out-of 4.0 with no E mark (fail). If the student failed to achieve the minimum requirement within the first year, then he/she could re-sit to the course(s) which are failed within the next year. The student will be dropped out if he/she could not finish the first common year within 2 years.

In the Bachelor level, the students are grouped in their selected study program within the school/faculty. In this level, the students must passed the next minimum 108 credit hours (to complete all the minimum credit hours of 144), with the minimum GPA of 2.0 with no D and E marks (fail) within 3 years time. If the student failed to satisfy the minimum requirement, then he/she could re-sit to the failed courses within 6 years (7 years before 2004) including the first common year. The student will be dropped out if he/she could not finish his/her Bachelor level within the maximum time. Besides that, the student will also be dropped out if he/she could not achieve minimum GPA of 1.0 during two consecutive semesters, either in the first common year or in the Bachelor level.

M. Faculty Workload

ITB define a full time load as 12-15 credit hours per semester as written in decision by Board of Regent (095/K01-MWA/2004). Out of a total of 12-15 credit hours, 10 credit hours are devoted to education, institution development, and student advising or residency, and the rest is for research activity. In the letter by the Senior Vice Rector of Resources, Prof. Dr. Ir. Carmadi Mahbub, dated March 27th, 2009, further explanation is given as follows:

1. Education activity can be counted from:
    a) Teaching a course: 1 credit hour teaching equals to 1 credit hour load.
    b) Laboratory: 2 hours lab teaching per week equals to 1 credit hour load.
    c) Student Extra-curricular advising: 3 hours advising per week equals to 1 credit hour load.
    d) Student advising: 3 hours for 20 students per semester equals to 1 credit hour load.
    e) Research/Final Project advisor: 3 hours per week equals to 1 credit hour load.
2. Institution Development is load when a faculty is given an administrative job.
    a) As a dean: 5-8 credit hours
    b) Vice dean: 4-7 credit hours

c) Program Chair: 2-3 credit hours
d) Research/Community Activity manager: 1-3 credit hours
e) Head of Research Group: 1-3 credit hours
f) Head of Laboratory: 1-2 credit hours
g) Head of Library: 1-2 credit hours
h) Head/Secretary/Member of senate: 2/2/1 credit hours
i) Head/Secretary of GKM: 1/0.5 – 2/1 credit hours
j) Etc.

THESE ARE ONLY PART OF THE LETTER BY THE SENIOR VICE RECTOR OF HUMAN RESOURCES, A MORE COMPLETE EXPLANATION CAN BE PROVIDED DURING VISITATION.

N. Tables

The tables that follow are simply a guide and are not required in the *Self-Study Report*. All are optional. The institution is encouraged to employ any means it chooses to represent itself to ABET and the visiting evaluation team.

Table D-1. Program Enrollment and Degree Data

Electrical Power Engineering

	Academic Year		Enrollment Year					Total Undergrad	Total Grad	Degrees Awarded			
			1st	2nd	3rd	4th	5th			Associates	Bachelors	Masters	Doctorates
Current Year	2016	FT	428	36	45	47	21	577	22		22		
		PT											
1	2015	FT	415	46	47	66	21	595	59		59		
		PT											
2	2014	FT	397	47	66	60	31	601	67		67		
		PT											
3	2013	FT	380	66	60	70	25	601	59		59		
		PT											
4	2012	FT	402	60	70	40	24	596	41		41		
		PT											

(1) Electrical Power Engineering Department

(2) School of Electrical Engineering and Informatics (SEEI)

(3) Electrical Power Engineering Program

Table D-2. Personnel
Electrical Power Engineering
Year: 2015/2016

	HEAD COUNT		FTE	RATIO TO FACULTY
	FT	PT		
Administrative	35		35	
Faculty (tenure-track)	54		54	
Other Faculty (excluding student Assistants)	-	-		
Student Teaching Assistants	-	69		
Student Research Assistants				
Technicians/Specialists	15	-	15	
Office/Clerical Employees	11	-	11	
Others	-	-		
Undergraduate Student enrollment	154	0	154	1

Graduate Student enrollment	242	0	242	1

Table D-3. Programs Offered by the Educational Unit

Program Title[1]	Modes Offered[2]				Nominal Years to Complete	Administrative Head	Administrative Unit or Units (e.g. Dept.) Exercising Budgetary Control	Submitted for Evaluation[3]		Offered, Not Submitted for Evaluation[4]	
	Day	Cooperative Education	Off Campus	Alternate Mode				Now Accredited	Not Now Accredited	Now Accredited	Not Now Accredited
BS in Electrical Engineering	√				4	Dr. Arif Sasongko ST., MT	SEEI	√			
BS in Telecommunication Engineering	√				4	Dr. Ir. Ian Josef Matheus Edward, MT	SEEI				√
BS in Informatics	√				4	Dr. techn. Saiful Akbar, ST, MT.	SEEI	√			
BS in Power Engineering	√				4	Dr. Ir. Nanang Hariyanto, M.T.	SEEI				√
BS in Information System and Technology	√				4	Achmad Imam Kristijantoro, ST, MSc, PhD	SEEI				√
BS in Biomedical Engineering	√				4	Dr. Widyawardana Adiprawita ST, MT.	SEEI				√
MS in Electrical Engineering	√				1.5	Dr. Ir. Bambang Anggoro Soedjarno, MT	SEEI				√
MS in Informatics	√				1.5	Bayu Hendrajaya, ST, MT, PhD	SEEI				√
Doctoral in Electrical Engineering and Informatics	√				3	Dr. Eng. Ayu Purwarianti, ST, MT	SEEI				√

Table D-4. Degrees Awarded and Transcript Designations by Educational Unit

Program Title	Modes Offered				Name of Degree Awarded	Designation on Transcript
	Day	Co-op	Off Campus	Alternative Mode		
BS in Electrical Engineering	√				BS	ST
BS in Telecomunication Engineering	√				BS	ST
BS in Infomatics	√				BS	ST
BS in Electrical Power Engineering	√				BS	ST
BS in Information and Sistem Technology	√				BS	ST
BS in Biomedical Engineering	√				BS	ST
MS in Electrical Engineering	√				MS	MT
MS in Informatics	√				MS	MT
Doctoral in Electrical Engineering and Informatics	√				Dr	Dr

Table D-5. Support Expenditures
Electrical Power Engineering

Fiscal Year	2015	2016	2017
Expenditure Category			
Operations (not including staff)	804,699,200	778,517,200	635,499,000
Travel	65,000,000	65,000,000	65,000,000
Equipment			
(a) Institutional Funds	174,482,500	146,530,700	102,000,000
(b) Grants and Gifts	794,829,000	-	-
Graduate Teaching Assistants			
Part-time Assistance (other than teaching)	88,800,000	50,000,000	88,000,000
Faculty Salaries	309,032,800	335,293,800	146,812,000

Table D-6. Faculty Salary Data
Electrical Power Engineering

	Professor	Associate Professor	Assistant Professor	Instructor
Number	19	26	47	19
High	590.872.564	403.254.239	305.581.237	148.749.422
Mean	389.172.778	203.970.755	143.780.270	120.042.918
Low	317.981.025	84.186.266	70.885.350	71.686.467

APPENDIX E – Graduates & Students Achievements

Confirmed company which graduates are working.

No	Name	NIM	Company
1	Sutan P.A. Sitorus	13206163	PT PLN (Persero)
2	Varian Aditya	13207021	PT. Halliburton Logging Services Indonesia
3	Sinondang Simon Gultom	18008025	PT Pertamina
4	Randy Ramos	18008032	PT. PLN (Persero)
5	Tony Eka Mahendra	18008021	PT Pembangkitan Jawa Bali
6	Michael Gorbachep Manurung	18008010	PT Elnusa Tbk
7	Sugeng Widodo	18008017	PT. PLN (Persero)
8	Amri Ahmad	18008018	PT. Siemens Indonesia.
9	Irham Fadlika	18009002	Universitas Negeri Malang
10	Wahyu Parbowo	18009016	TMLEnergy (PT Tritama Mitra Lestari)
11	Masramdhani Saputra	18009021	Politeknik Negeri Malang
12	M Andre Roswan	18008012	PT. PLN (Persero)
13	Muchammad Khusnul Yaqin	18008031	ABB Indonesia
14	Rukan Nasrullah Adha	18009007	PT Sigma Solusi Integrasi
15	Theresia Andina D P	18009012	PT Guna Elektro
16	Roery Saputra	18009026	PT UNINDO (General Electric - GE)
17	Leonard Manatar Marulitua	18008030	PT. Siemens Indonesia
18	Benny Leniker	18009038	PT.Wijaya Karya (Persero) Tbk.
19	Cyrus Quwwah	18009039	PT Calbeewings
20	Arif Kuncoro Adi	18010030	PT Indonesia Power
21	Juan Josua Vandendungan	18010034	PT PLN PERSERO
22	Angga Kusumadinata	18010046	PT. PLN (Persero)
23	Budi Sutrisno	18010051	PT. PLN (Persero)
24	Karina Anindita	18010059	PT Paragon Technology and Innovation
25	Muhamad Rais Bahtiar	18010061	PT Badak NGL
26	Gregorius Alvin Tanthio P	18010062	PT HM Sampoerna Tbk. / Philip Morris International
27	Yoga Dwi Utomo	18010068	PT Badak NGL
28	Alam Hardik Dewantara	18010070	PT Pembangkit Jawa Bali
29	Randy Mario Sihombing	18010006	PT Pembangunan Perumahan (Persero) Tbk
30	Rachmat Sannia Putra	18010035	PT Cikarang Listrindo
31	Ibrahim Alhanif	18010037	PT Aplikanusa Lintasarta
32	Rezky Khairun Zain	18010047	PT. Asahimas Chemical
33	Brampi Wicaksono A	18009004	PT. PLN Batam
34	Fauzan Bryantara	18009024	Wiraswasta
35	Mohammad Aris Darmawan	18011008	PT PLN (Persero)
36	Rian Yulianto	18011009	PT PLN (Persero)
37	Yoga Aji Surandaka	18011010	PT. Freeport Indonesia
38	Riando Hotasi Sirait	18011012	Hino Motor, Ltd. Japan
39	Yonas Dwiananta Yuwono	18011015	PT. Bukit Asam (persero) Tbk.

40	Akbar Jaya Binawan	18011016	PT. Krakatau Steel (Persero) Tbk
41	Christian .T.H. Sidauruk	18011026	PT. PLN (Persero) Area Bandengan
42	Hafit Jamaludin	18011028	PT Indonesia Power
43	Reinhart Sahala Partogi	18011035	PT Siemens Indonesia
44	Maulana Aufar Gituri	18011036	General Electric (PT. GE Operations Indonesia)
45	Yoan Elfina Litani	18011041	PT HM Sampoerna Tbk
46	Imam Suandi	18011054	Xtremax Pte .Ltd.
47	Herlin Agustina	18011055	PT. PLN (Persero)
48	Rian Maulana	18011056	PT PLN (PERSERO)
49	I Nyoman Sathyagama Dipanatha	18011059	Toyota Motor Manufacturing Indonesia
50	Roro Roudhotul Jannah	18011029	PT PLN (Persero)
51	Ario Nuswantoro	18011044	PT Inti Karya Persada Tehnik
52	Yosafat Marthin Samosir	18011053	PT. PLN (Persero)
53	Ahmad Ulul Albab	18011014	PT PLN Batam
54	Sahilaushafnur Rosyadi	18012001	PT. LEN Industri Persero
55	Hamzah Wicaksana	18012010	PT Krakatau Nippon Steel Sumikin
56	Syahid Rohmatulloh	18012011	PT Bank Mandiri
57	Muhammad Lathieful Haq	18012015	PT. Chandra Asri Petrochemical
58	Aghnia Hauna Muhshi	18012017	Schlumberger
59	Andika Lambarindo	18012037	PT PLN (Persero)
60	Bimo Wicaksono	18012059	Yamaha Motor Corporation Japan, Shizuoka
61	Bima Deniansha	18012005	PT. Asia Daya Hub Indonesia
62	Johanno Afrizal Wibowo	18012027	PT. PLN Enjiniring
63	Cahyo Subroto	18012029	fujitsu
64	Ary Rendra A P	18012043	PT. Toyota Motor Manufacturing Indonesia

Table E.1 Program Graduates

No	Initial or Current Employment/Graduate Study
1	PT Toyota Motor Manufactoring Indonesia
2	ABB Indonesia
3	Hino Motor, Ltd. Japan
4	PT Bank Mandiri
5	PT Cikarang Listrindo
6	PT Elnusa Tbk.
7	PT HM Sampoerna Tbk. (Philip Morris International)
8	PT Indonesia Power
9	PT Krakatau Nippon Steel Sumikin
10	PT Paragon Technology and Innovation
11	PT Pembangkitan Jawa Bali
12	PT Pembangunan Perusahaan (Persero) Tbk.
13	PT Pertamina
14	PT PLN (Persero)
15	PT PLN Batam
16	PT Siemens Indonesia
17	PT UNINDO (General Electric – GE)
18	PT WASKITA KARYA (Persero) Tbk.
19	PT Bukit Asam (Persero) Tbk.
20	PT Chandra Asri Petrochemical
21	PT Freeport Indonesia
22	PT Halliburton Logging Services Indonesia
23	PT Krakatau Steel
24	PT LEN Industri (Persero)
25	PT PLN Enjiniring
26	PT Asahimas Chemical
27	PT Wijaya Karya (Persero) Tbk.
28	Schlumberger
29	PT Tritama Mitra Lestari (TML Energy)
30	Xtremax Pte. Ltd.

SIGNATURE ATTESTING TO COMPLIANCE

By signing below, I attest to the following:

That Electrical Power Engineering Program has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Engineering Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual.*

Dr. Ir. Jaka Sembiring, M.Eng.

Dean's Name (As indicated on the RFE)

Signature **Date 20th June 2017**