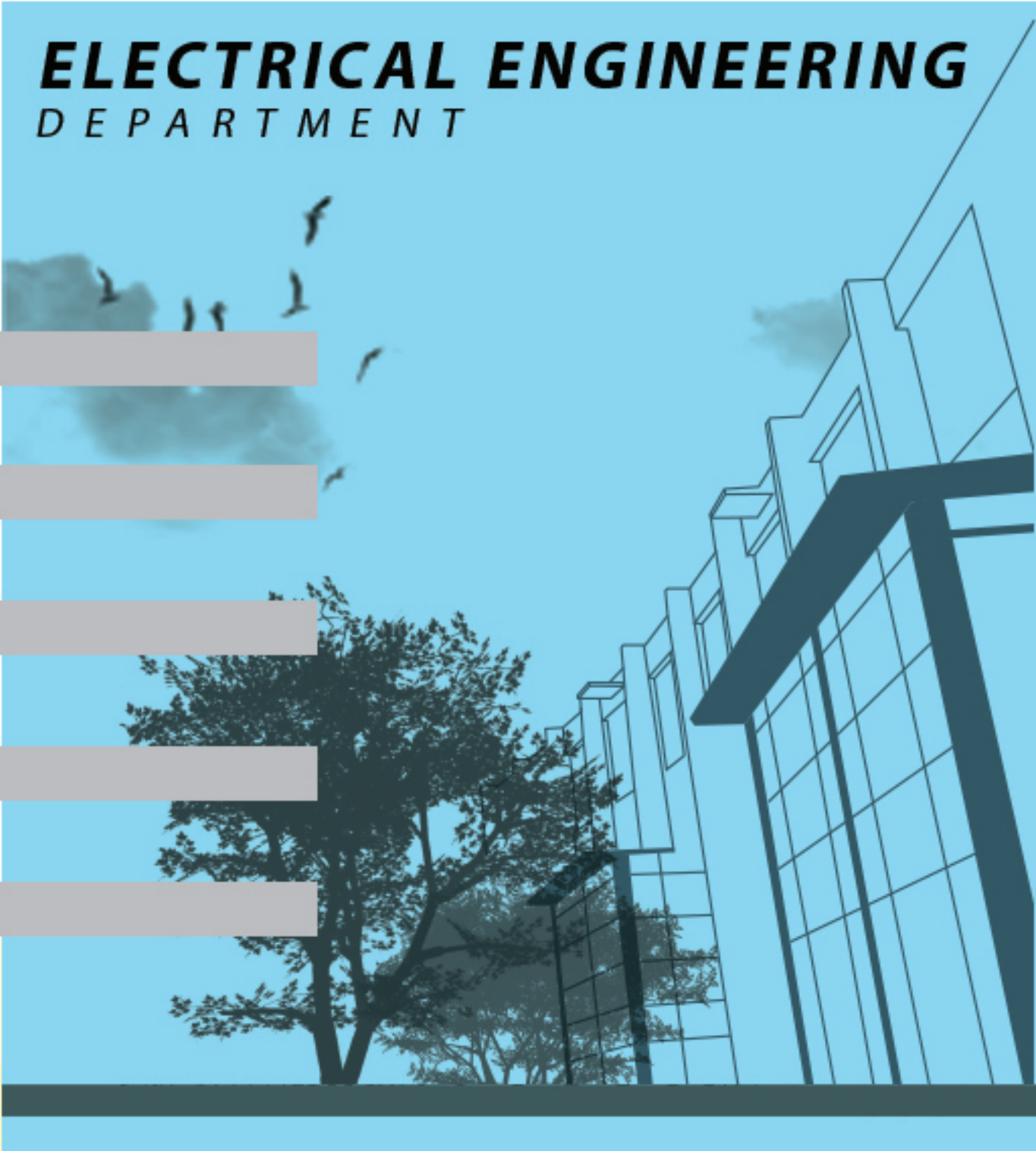




ACADEMIC GUIDEBOOK

2016 - 2017 edition

ELECTRICAL ENGINEERING DEPARTMENT





PROFILE OF FTUI
AND DEPARTMENTS



1. PROFILE OF FTUI AND DEPARTMENTS

1.1. HISTORY OF FTUI

The history of the Faculty of Engineering, Universitas Indonesia (FTUI) began with an offer made from young engineers belonging to the Society of Engineers Indonesia (PII), to the first President of the Republic Indonesia, Bung Karno, for the renovations of the heavily damaged main streets of Jakarta. At that time Jakarta was preparing for the International Sports Event, the GANEFO. This bid was welcomed by President Soekarno. The young engineers were granted permission to start the renovations under the condition that all work must be completed within two weeks period. Headed by Ir. Bratanata, Ir. Roosseno, Ir. Sutami, and Ir. A.R. Soehoed, the project was completed on time.

After successful accomplishment of the street renovation project, these young engineers with their iron will felt that there was more that they could do to serve our country. But what? Then they thought of a brilliant idea: “Why not establish an engineering faculty in Jakarta as an alternative to the one in Bandung? This way those residing in the country’s capital would not need to travel far to Bandung for an engineering education”.

During the ceremonial event of Lenso dancing at the Pembangunan Building (formerly known as Pola Building) to welcome the GANEFO guests of honor, the young engineers brought their idea to President Soekarno to which he responded by inviting them to the Presidential Palace the next day. During the meeting in the Presidential Palace, the President wholeheartedly approved of the idea and even directly appointed Prof. Ir. Rooseno as the first Dean of the Faculty of Engineering. The President also instructed that the new Faculty of Engineering would be part of the University of Indonesia under the leadership of its Rector, dr. Syarif Thayeb.

The Establishment of Faculty of Engineering UI

Once dr. Syarif Thayeb served as the Minister of Higher Education and Science, he issued Decree No. 76 dated July 17, 1964 regarding the establishment of the Faculty of Engineering. Faculty of Engineering was officially established in Jakarta without any official ceremony or celebration, under the banner of the University of Indonesia as youngest faculty. And so the history of the Faculty of Engineering Universitas Indonesia began with the first three Study Programs with their respective Head of Study Programs: Ir. Sutami as Head of Civil Engineering Study Program, Ir. Ahmad Sayuti as Head of Mechanical Engineering Study Program and Ir. K. Hadinoto as Head of Electrical Engineering Study Program.

The Metallurgy and Architecture Study Programs were opened the following year with their respective Head of Study Programs: Dr. Ing. Purnomosidhi H. and Ir. Sunaryo S.. Ir. Roosseno as Dean was assisted by Ir. Sutami as Vice Dean for Academic Affairs, Ir. Slamet Bratanata as Vice Dean for Administration and Finance and Dr. Ing Purnomosidhi H. as Vice Dean for Student Affairs and Alumni. In its early activities in 1964, Faculty of Engineering UI was supported by 30 lecturers and 11 non-academic employees offering a 32 course subject curriculum. The first class of Faculty of Engineering UI consisted of 199 students. In five and a half years, 18 of them had successfully completed their study and graduated as certified Engineers.

In 1985, the study program Gas Engineering (originally under the Metallurgy Study Program) joined the study program Chemical Engineering (originally under the Mechanical Study Program) and formed the Gas and Petrochemical Engineering Study Program with its first Head of Study Program, Dr. Ir. H. Rachmantio. The Industrial Engineering Study Program, the youngest Study Program in Faculty of Engineering UI, was opened in 1999 with its first Head of Study Program, Ir. M. Dachyar, M.Sc. The term Study Program was later changed to Department and is still used today.

1.2. VISION AND MISSION OF FTUI

FTUI Vision

FTUI as a leading engineering education institution with the ability to compete in the international world.

FTUI Mission:

- Preparing its graduates to become lifelong learners, to be able to adapt to the working environment, and to acquire decent personalities and leadership qualities.
- To be center of excellence for education and research activities, to serve stakeholders' needs through facilitation of conducive academic environment.
- To be a leading institution with the initiatives that responds to local, national and global societal needs.

1.3. UI and FTUI Administration

UI

Rector:

Prof. Dr. Ir. Muhammad Anis. M. Met.

Deputy Rector for Academic and Student Affairs:

Prof. Dr. Bambang Wibawarta, S.S., M.A.

Deputy Rector for Finance, Logistic and Facilities:

Prof. Dr. Adi Zakaria Afiff

Deputy Rector for Research, and Innovation

Prof. Dr. rer. nat Rosari Saleh

Deputy Rector for for Human Resources, Development and Cooperation

Dr. Hamid Chalid, S.H., LL.M

FTUI

Dean of Engineering:

Prof. Dr. Ir. Dedi Priadi, DEA

Vice Dean I:

Dr. Ir. Muhamad Asvial, M.Eng

Vice Dean II:

Dr. Ir. Hendri DS Budiono, M.Eng

Associate Dean for Academic and Head of Faculty Administration Center:

Dr. Ir. Wiwik Rahayu, DEA

Associate Dean for Research & Community Service

Prof. Dr. Ir. Akhmad Herman Yuwono, M.Phil.Eng

Associate Dean for Cooperation, Students Affairs, Alumni & Venture :

Dr. Badrul Munir, ST., M.Eng.Sc

Associate Dean for General Affairs & Facilities

Jos Istiyanto, S.T., M.T., Ph.D

Head of Academic Quality Assurance Unit

Prof. Ir. Mahmud Sudibandriyo, M.Sc., Ph.D

Head of Management System Assurance Development Unit

Dr. Ir. Rahmat Nurcahyo, M.Eng. Sc.

Departments

The following are list of Head of Department, and Vice Head of Department:

Civil Engineering:

Prof. Ir. Widjojo A. Prakoso, M.Sc., Ph.D
 Mulia Orientilize, S.T., M.Eng

Mechanical Engineering:

Dr.-Ing. Ir. Nasruddin, M.Eng
 Dr. Ario Sunar Baskoro, ST., MT., M.Eng

Electrical Engineering:

Ir. Gunawan Wibisono, M.Sc., Ph.D
 Dr. Arief Udhiarto, S.T., M.T

Metallurgy & Materials Engineering:

Dr. Ir. Sri Harjanto
 Dr. Deni Ferdian, ST, M.Sc

Architecture:

Prof. Yandi Andri Yatmo, S.T., M.Arch., Ph.D
 Rini Suryantini, S.T., M.Sc

Chemical Engineering:

Prof. Ir. Sutrasno Kartohardjono, M.Sc., Ph.D
 Dr. Ir. Nelson Saksono, M.T.

Industrial Engineering:

Dr. Akhmad Hidayatno, S.T., MBT.
 Dr.-Ing. Amalia Suzianti, ST., M.Sc.

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Prof. Dr. Ir. Tommy Ilyas, M.Eng	Prof. Ir. Triatno Yudo Harjoko, M.Sc., Ph.D
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Prof. Dr. Ir. I Made Kartika, Dipl. Ing.	Prof. Dr. Ir. Widodo Wahyu P, DEA
Prof. Dr. Ir. Raldi Artono Koestoer	Prof. Dr. Ir. M. Nasikin, M.Eng
Prof. Dr. Ir. Bambang Sugiarto, M.Eng	Prof. Dr. Ir. Anondho W., M.Eng
Prof. Dr. Ir. Yanuar, M.Eng	Prof. Dr. Ir. Setijo Bismo, DEA
Prof. Dr. Ir. Tresna P. Soemardi	Prof. Dr. Ir. Slamet, M.T
Prof. Dr. Ir. Budiarmo, M.Eng	Prof. Dr. Ir. T. Yuri M. Zagloel, M.Eng.Sc
Prof. Dr. Ir. Yulianto S. Nugroho, M.Sc	Prof. Ir. Sutrasno Kartohardjono, M.Sc., Ph.D
Prof. Dr.-Ing. Nandy Putra	Prof. Dr. Ir. Yusuf Latief, MT
Prof. Dr. Ir. Djoko Hartanto, M.Sc	Prof. Dr. Ir. Dedi Priadi, DEA
Prof. Dr. Ir. Dadang Gunawan, M.Eng	Prof. Dr. Ir. Harinaldi, M.Eng
Prof. Dr. Ir. Bagio Budiardjo, M.Sc	Prof. Dr. Ir. Djoko M Hartono, SE., M.Eng
Prof. Dr. Ir. Eko Tjipto Rahardjo, M.Sc	Prof. Dr. Ir. Muhammad Anis, M.Met
Prof. Dr. Ir. Harry Sudibyo	Prof. Ir. Isti Surjandari Prajitno, MT., MA., Ph.D
Prof. Ir. Rinaldy Dalimi, M.Sc., Ph.D	Prof. Dr. Ir. Danardono Agus S, DEA
Prof. Dr. Ir. Rudy Setiabudy, DEA	Prof. Dr. Heri Hermansyah, S.T., M.Eng.
Prof. Dr. Ir. Iwa Garniwa, MK., MT	Prof. Dr. Ir. Sigit P. Hadiwardoyo, DEA
Prof. Dr. Ir. Nji Raden Poespawati,MT	Prof. Dr. Ir. Muhammad Idrus Alhamid

Prof. Dr. Ir. Riri Fitri Sari, M.Sc.MM
 Prof. Dr. Benyamin Kusumoputro, M.Eng
 Prof. Dr. Ir. Kalamullah Ramli, M.Eng
 Prof. Dr. Ir. Eddy S. Siradj, M.Sc
 Prof. Dr. Ir. Johny Wahyuadi Mudaryoto
 Prof. Dr. Ir. Anne Zulfia, M.Sc
 Prof. Dr. Ing. Ir. Misri Gozan, M.Tech.
 Prof. Ir. Mahmud Sudibandriyo, M.Sc., Ph.D

Prof. Dr. Ir. A. Herman Yuwono, M.Phil.Eng
 Prof. Yandi A. Yatmo, S.T., M.Arch., Ph.D
 Prof. Dr. Kemas Ridwan Kurniawan, ST., M.Sc
 Prof. Dr. Ir. Adi Surjosatyo, M.Eng
 Prof. Ir. Widjojo Adi Prakoso, M.Sc., Ph.D
 Prof. Dr. Ir. Winarto, M.Sc
 Prof. Dr. Ir. Nelson Saksono, MT

INTERNATIONAL ADJUNCT PROFESSOR

Prof. Dr. James-Holm Kennedy, University of Hawaii, USA.
 Prof. Dr.-Ing. Axel Hunger, University of Duisburg, Germany.
 Prof. Josaphat Tetuko Sri Sumantyo, PhD, Chiba University, Japan, Remote Sensing
 Prof. Dr. Fumihiko Nishio, Chiba University, Japan, ICT
 Prof. Chit Chiow (Andy) Tan, School of Mechanical, Manufacturing and Medical Engineering, Queensland University of Technology, Australia, Mechanical Engineering
 Prof. Kozo Obara, Dept. of Nanostructure and Advanced Materials, Kagoshima University, Japan, Nanomaterial dan Energi
 Prof. Freddy Y.C. Boey, Nanyang Technological University, Singapore, Nanomaterial dan Biomedical Engineering
 Prof. Kyoo-Ho Kim, Dr.Eng, School of Material Science and Engineering, Yeungnam University, Korea, Nanomaterial dan Energi
 Prof. Bernard Cambou, Ecole Centrale de Lyon, France, INRETS (French National Institute for Transport and Safety Engineering), Transport and Safety
 Prof. Chia-Fen Chi, Dept. of Industrial Engineering, National Taiwan University Science and Technology, Industrial Management
 Prof. Dr. Katsuhiko Takahashi, Dept. of Artificial Complex Systems Engineering, Hiroshima University, Japan, Artificial Complex System Engineering
 Prof. Martin Betts, Faculty of Built Environment and Engineering, Queensland University of Technology, Australia.
 Prof. L. P. Lighthart (Emeritus), Delft University of Technology, Dutch
 Prof. Dr. Koichi Ito (Printed Antenna, Small Antenna, Medical Application of Antenna, Evaluation of Mutual Influence between Human Body and Electromagnetic Radiations), Chiba University, Japan.
 Prof. Dr. Uwe Lahl
 Prof. Tae-Jo. Ko.
 Prof. Michiharu Tabe, Research Institute of Electronics, Shizuoka University
 Prof. Masaki Nagatsu, Shizuoka University
 Prof. Hidenori Mimura, Shizuoka University

1.4. ACADEMIC PROGRAMS AT FTUI

FTUI consists of seven Departments and **twelve Undergraduate Study Programs:**

- | | |
|-------------------------------|--|
| (1) Civil Engineering | (7) Metallurgy & Materials Engineering |
| (2) Environmental Engineering | (8) Architecture |
| (3) Mechanical Engineering | (9) Interior Architecture |
| (4) Marine Engineering | (10) Chemical Engineering |
| (5) Electrical Engineering | (11) Bioprocess Engineering |
| (6) Computer Engineering | (12) Industrial Engineering |

seven Master Programs:

- | | |
|---|----------------------------|
| (1) Civil Engineering | (5) Architecture |
| (2) Mechanical Engineering | (6) Chemical Engineering |
| (3) Electrical Engineering | (7) Industrial Engineering |
| (4) Metallurgy and Material Engineering | |

and seven Doctoral Programs:

- | | |
|---|----------------------------|
| (1) Civil Engineering | (5) Architecture |
| (2) Mechanical Engineering | (6) Chemical Engineering |
| (3) Electrical Engineering | (7) Industrial Engineering |
| (4) Metallurgy and Material Engineering | |

and one Professional Program for Architect

Accreditation of FTUI Academic Programs

The National Board of Accreditation for Higher Education (BAN-PT) has awarded the following accreditation level for all study program in the Faculty of Engineering:

for Bachelor Programs:

- | | |
|---------------------------------------|---|
| Civil Engineering : A | Industrial Engineering : A |
| Mechanical Engineering : A | Naval Architecture & Marine Engineering : A |
| Electrical Engineering : A | Computer Engineering : B |
| Metallurgy & Material Engineering : A | Environmental Engineering : B |
| Architecture : A | Architecture Interior : A |
| Chemical Engineering : A | Bioprocess Engineering : A |

Accreditation for Master Program is as follows:

- | | |
|--|----------------------------|
| Civil Engineering : A | Architecture : A |
| Mechanical Engineering : A | Chemical Engineering : A |
| Electrical Engineering : A | Industrial Engineering : B |
| Metallurgy and Materials Engineering : A | |

Accreditation for Doctoral Program is as follows:

- | | |
|--|----------------------------|
| Civil Engineering : A | Chemical Engineering : A |
| Electrical Engineering : A | Mechanical Engineering : A |
| Metallurgy and Materials Engineering : A | Architecture : B |

In 2008 & 2010, the Departments of Mechanical Engineering, Civil Engineering, Electrical Engineering, Metallurgy and Materials Engineering, Architecture and Chemical Engineering have been accredited by the Asean University Network (AUN); and also In 2013 Departments of Industrial Engineering have been accredited by the ASEAN University Network (AUN).

International Undergraduate Program (Double-Degree & Single Degree)

Since 1999, Faculty of Engineering has established an international undergraduate program in engineering (double-degree program) with the following renowned Australian higher education institutions: Queensland University of Technology (QUT), Monash University, Curtin University of Technology, The University of Queensland and The University of Sydney. Graduates from this international undergraduate program will be awarded a Bachelor of Engineering degree from our Australian University partner and a Sarjana Teknik degree from Faculty of Engineering UI when they return to FTUI and fulfill certain requirements. The double degree cooperation with QUT involves the study programs Civil Engineering, Mechanical Engineering, Electrical Engineering and Architecture. The double degree cooperation with Monash University involves the study programs

Metallurgy & Material Engineering and Chemical Engineering. The double degree cooperation with Curtin University involves the study programs Chemical Engineering, Architecture, Metallurgy & Material Engineering and Electrical Engineering, with other study programs to follow. The double degree cooperation with the University of Queensland involves the study programs Mechanical Engineering, Electrical Engineering, Chemical Engineering and Metallurgy & Material Engineering. This international undergraduate program provides high quality engineering education in the international level. Since 2011, students will also have a choice to continue their final two years at FTUI as part of the newly opened Single Degree International Program.

Since 2011, students will also have a choice to continue their final two years at FTUI as part of the newly opened Single Degree International Program. The undergraduate international single degree program was launched in 2011 as a result of an increasing demand to provide an international quality education locally. Students in this program are not obligated to continue their last four semester of study at one of our partner universities like their classmates who wishes to pursue a double degree. However, students of single degree program are required to do Study Abroad for a period between one to four semesters at an overseas university. The aims are to widen the international perspective of the students, to have experience to study in an overseas university, to enhance language capability, to enhance cross-cultural adaptability. Study Abroad can be conducted during regular semesters.

Undergraduate Parallel Class Program (Diploma Track) (Extension Program)

The Undergraduate Extension Program in FTUI was initiated in 1993. At the beginning the program was held for only four Study Programs (Civil, Mechanical, Electrical and Metallurgy Engineering). In 1995 the program was also opened for the Chemical Engineering Study Program (Gas and Petrochemical Engineering) followed by Industrial Engineering in 2002. Starting in 2011, the Undergraduate Extension Program of FTUI was cancelled. However, the faculty still give the opportunity for future FTUI students that are graduates from Diploma Program who wishes to continue their study into the FTUI Undergraduate Program. Students are now able to apply through the Undergraduate Parallel Program (Diploma Track) by using the Credit Transferred System. The number of credits acknowledge will be decided by their respective Departments.

The Undergraduate Parallel Program is a full time program where students are expected to be a full time students in campus. This is due to the schedule set for the program which started from the morning period and well into the afternoon. Currently there are six Study Programs available to choose from: Civil Engineering, Mechanical Engineering, Electrical Engineering, Metallurgy & Material Engineering, Chemical Engineering, Industrial Engineering.

1.5.1. DEPARTMENT OF CIVIL ENGINEERING

GENERAL

The Civil Engineering Department previously known as Civil Engineering Study Program was established together with the Faculty of Engineering Universitas Indonesia (FTUI) at 17 July 1964. In the initial stage of development, Civil Engineering Department - FTUI offered one study program, Civil Engineering, with two majors, structural engineering and water resources engineering. Following the demand and development of science and technology, it was then expanded with four additional majors, i.e. transportation engineering, geotechnical engineering, sanitary engineering and construction management. With the improvement of human resources and facilities, Postgraduate Program for master degree (S2) and doctoral Degree (S3) were established in 1992 and 2001, respectively. In 2006, the Department established the undergraduate program on Environmental Engineering. Previously, Environmental Engineering is one of the majors in Civil Engineering. There are eight specializations for Master and Doctoral Program in Civil Engineering, structural engineering, geotechnical engineering, water resources management, transportation system & engineering, construction management, environmental engineering, project management and infrastructure management.

To ensure the quality, the Department is regularly accredited by the national accreditation board, BAN-PT (Badan Akreditasi Nasional Pendidikan Tinggi) since 1998. All study programs of Civil Engineering, undergraduate, master and doctor reach the highest grade of "A". The Environmental Engineering Study Program of was nationally accredited in 2010. The under graduate program of Civil Engineering was accredited internationally in 2001 by The Joint Board of Moderators of the Engineering Council consisting of Institution of Structural Engineers (ISE), Institution of Civil Engineers (ICE), and Chartered Institution of Building Service Engineers of the United Kingdom. However, due to changes in their policy, reaccreditation was discontinued. In 2008, undergraduate program of Civil Engineering was assessed by ASEAN University Network - Quality Assurance Program (AUN-QA). In order to maintain the quality in education, AUN-QA reassessment was conducted in 2015.

Civil Engineering is the oldest engineering discipline and encompasses many specialties. Civil engineering can be described as the application of engineering to civil society. It applies the principles of engineering to meet society's fundamental needs for housing, transportation, sanitation, and the other necessities of a modern society. The engineers deal with the design, construction, and maintenance of the physical and naturally built environment, including works like roads, bridges, canals, dams, and buildings, as well as other challenges such as deteriorating infrastructures, complex environmental issues, outdated transportation systems, and natural disasters. Civil engineering education is to prepare students to be master planners, designers, constructors, and managers of various civil engineering works. The graduates can work in all levels: in the public sector from municipal through to national governments, and in the private sector from individual homeowners through to international companies.

Environmental engineering is defined as branch of engineering concerned with the application of scientific and engineering principles for protection of human populations from the effects of adverse environmental factors; protection of environments both local and global from the potentially deleterious effects of natural and human activities; and improvement of environmental quality. Tasks of environmental engineers include evaluation of environmental quality of water, air and soils by developing strategies and methods, design of facilities or programs, evaluation of results and assessment of the economics and efficiency of processes. The Environmental Engineering Study Program provide graduates with professional and competence in planning, designing, constructing and managing environmental infrastructure for: drinking water treatment, liquid and solid waste management, drainage, environmental sanitation, water resources, air pollution, pollution prevention & environmental impact assessment.

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VISION and MISSIONS**VISION**

“To become a center of knowledge and technology in Civil Engineering and Environmental Engineering and to play an important role in global market”

MISSIONS

- To produce graduates who have a mastery of fundamental knowledge and meet the international standard and have environmental conscious.
- To contribute to betterment of society through quality research and professional community services in civil engineering & environmental engineering with sustainability considerations.
- To prepare graduates for leadership roles, having effective communication skills and professional ethics.

STAFFS OF THE DEPARTMENT OF CIVIL ENGINEERING**Head of Department:**

Prof. Ir. Widjojo Adi Prakoso, M.Sc., Ph.D

Vice Head of Department:

Mulia Orientilize, ST, MEng

Head of Civil Engineering Study Program:

Prof. Ir. Widjojo Adi Prakoso, M.Sc., Ph.D

Head of Environmental Engineering Study Program:

Dr. Ir. Setyo Sarwanto Moersidik, DEA

Head of Laboratory**Head of Structure and Materials Laboratory:**

Dr. Ir. Elly Tjahjono S, DEA

Head of Soil Mechanics Laboratory:

Erly Bahsan, ST, Mkomp

Head of Hydraulics, Hydrology and River Laboratory:

Ir. Siti Murniningsih, MS

Head of Transportation Laboratory:

Dr. Ir. Tri Tjahjono

Head of Mapping and Surveying Laboratory:

Ir. Alan Marino, MSc

Head of Sanitation & Environment Laboratory:

Ir. Gabriel S. Boedi Andari, M.Eng., Ph.D

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Prof, UI) Geotechnic

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- Prof. Dr. Ir. Yusuf Latief, MT.**, latief73@eng.ui.ac.id (Ir, UI; MT, Dr, UI; Prof. UI) Project Management
- Prof. Dr. Ir. Djoko M. Hartono, SE., M.Eng.**, djokomh@eng.ui.ac.id (Ir, ITB; M.Eng, Asian Institute of Technology; Dr, UI; Prof, UI) Environmental
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Ir. Essy Ariyuni, PhD, essy@eng.ui.ac.id (Ir, ITS; MSc, University of Wisconsin; Dr, Quensland University of Technology) Structure
Ir. Iwan Renadi Soedigdo, PhD, irs1210@yahoo.com (Ir, UI; MSCE, The George Washington University; Ph.D, Texas A&M University) Structure
Ir. Heddy Rohandi Agah, M.Eng, agah@eng.ui.ac.id (Ir, UI; M.Eng, Asian Institute of Technology) Transportation
Ir. Madsuri, MT, madsuri@eng.ui.ac.id (Ir, MT, UI) Structure
Ir. Setyo Supriyadi, M.Si, setyosuprijadi@yahoo.com (Ir, Msi, UI) Structure

1.5.2. DEPARTMENT OF MECHANICAL ENGINEERING

GENERAL

The Department of Mechanical Engineering, previously known as Mechanical Engineering Study Program. The department was established together with the launch of the faculty of engineering Universitas Indonesia in November 27, 1964 at Salemba, Jakarta. Nowadays there are 2 study programs within the department, which are: Mechanical Engineering Study Program and Marine Engineering Study Program. The mechanical engineering study program provides the knowledge which focused into Energy Conversion, Product Design, Manufacturing Process and also the basic of Industrial operational and managerial. The Marine Engineering study program provide the education which focused into Ship design, Ship manufacturing process, ship maintenance, ship machinery installation and also the rules and laws of marine. The graduates of the mechanical engineering have worked in several areas such as automotive industry, oil and gas industry, heavy duty engine, educational institution, research institution and other industries. The department of mechanical engineering organized several programs, which are: Bachelor Degree (Regular, Parallel, and International class) Master Degree and Doctoral Degree. Since August 2007, the department of mechanical engineering received the ISO 9001: 2000 for quality management system in Mechanical Engineering Study Program. In 2011, The Department of Mechanical Engineering once again received the ISO 9001: 1008 for quality management system. Certification by international agencies is one of management's commitments in quality management, to ensure and enhance academic quality and stakeholder satisfaction. The mechanical engineering study program also received the highest academic accreditation point according to the National Accreditation Board in 2005. In 2008, the Department of Mechanical Engineering has also gained international recognition in the form of accreditation of the ASEAN University Network (AUN). This again shows the commitment the Department of Mechanical Engineering to develop international education and excel in their fields, as stated by the firm through the vision, mission and goals.

Developing nations are very dependent of human resource development. Resource is people who set the direction, goals, implement and develop the nation's life. With good human resources are expected to achieve the life of prosperous and affluent nations. Therefore, the developments of human resources become the key of national development. Higher education in Indonesia is part of the National Education System which aims to develop the intellectual life of the nation through the development of human resources to carry out three main activities of the so-called "Tridharma Universities", namely :

1. Hold a higher level education
2. Conduct the scientific research
3. Perform the Community service

In order to develop human resources for the life of the nation, the Department of Mechanical Engineering has set a goal of three main activities is to be a reference to any academic activity. In education, has a goal to produce graduates who are able to analyze and synthesize the characteristics of mechanical systems, designing and planning systems and mechanical equipment as well as managing the production installation, and be able to analyze and solve any scientific problem, work together in teams, and develop themselves and their knowledge, with a lofty intellectual attitude, pattern of systematic thinking, logical and integrated. In the field of research, Department of Mechanical Engineering has a goal to contribute and play a role in the development of mechanical science and technology and a continuous intake of the educational process. While the field of devotion and service to the community, aims to provide ideas and direct involvement in quality improvement and enhancement of community and industry.

To answer the demand of graduate academic programs that have the character of leadership and excellence in academic and professionalism in the field of Mechanical Engineering, both at the level of Bachelor, Master, or PhD, the Department of Mechanical Engineering, developed the design of competency-based academic curriculum is implemented through the student centered teaching

activity(student centered learning). According to the degree, in the curriculum design the research activity become the major aspect in the Doctoral Degree.

In the 2012 curriculum design, the integration of the design between bachelor degree, master degree and doctoral degree curriculum has been pursued, so it is possible for a student with an excellent academic record to take courses from a higher degree (Master and Doctoral) by using the credit transfer regulation through the Fast Track Program.

A more detailed explanation of each of the courses organized by The Mechanical Engineering and Marine Engineering Study Program, the description of the main academic competence, and other supporters of the graduates of each program of study, are given in the following section.

Contact

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VISION and MISSION

Vision

“Become the center of the excellent research and education service in Mechanical Engineering”

Mission

“To conduct research and research-based education for the development of science and technology in the field of mechanical engineering, and to conduct research and education and use it to improve the quality of life and humanity”

Head of Department :

Dr.-Ing. Ir. Nasruddin, M.Eng

Vice Head of Department:

Dr. Ario Sunar Baskoro, ST., MT., M.Eng

Head of Mechanical Engineering Study Program:

Dr-Ing.Ir. Nasruddin, MEng

Head of Naval Architecture and Marine Engineering Study Program:

Dr. Agus S. Pamitran, ST, MEng

Assistant to Vice Head for Academic Affairs:

Dr.Eng. Radon Dhelika, B.Eng, M.Eng

Assistant to Vice Head for Non-Academic Affairs:

Dr. Agung Shamsuddin Saragih, S.T, MS.Eng

Cooperation Relationship Coordinator:

Dr. Yudan Whulanza, ST., MSc.

Venture Coordinator / Director of P2M:

Ardiyansyah, S.T, M.Eng, PhD

Head of Laboratory

Head of Mechanical and Biomechanic Design Laboratory :

Dr. Ir. Wahyu Nirbito, MSME.

Head of Mechanical Technology Laboratory:

Prof. Dr. Ir. Danardono A.S., DEA, PE

Head of Thermodynamics Laboratory:

Prof. Dr. Ir. Yulianto S. Nugroho, MSc, PhD.

Head of Heat Transfer Laboratory:

Dr. Ir. Engkos A. Kosasih, MT

Head of Fluid Mechanics Laboratory:

Dr. Ir. Warjito, M.Eng.

Head of Manufacture and Otomatization Laboratory:

Dr. Ario Sunar Baskoro, ST., MT., M.Eng

Head of Air-conditioning Engineering Laboratory:

Prof. Dr. Ir. M. Idrus Alhamid

Head of Ship Design Laboratory:

Prof. Dr. Ir. Yanuar, M.Eng. MSc.

Head of Research Cluster- Kelompok Ilmu (KI)

Head of KI. Energy Conversion:

Prof. Dr. Ir. M. Idrus Alhamid

Head of KI. Design, Manufacture and Automation:

Dr. Ir. Gandjar Kiswanto, M.Eng.

Head of KI. Naval Architecture and Marine Engineering:

Dr. Agus S. Pamitran, ST, M.Eng

BOARD OF PROFESSOR

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Prof. Dr. Keizo Watanabe

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FULL-TIME FACULTY

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PART-TIME (NON-TENURED) FACULTY

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Agung Subagio

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Rusdy Malin

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Tris Budiono M

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1.5.2. DEPARTMENT OF ELECTRICAL ENGINEERING

GENERAL

The Department of Electrical Engineering, Faculty of Engineering, Universitas Indonesia was established at the same time with the establishment of Faculty of Engineering on July 17th, 1964. Even though the classes had been started since October 17th, 1964. At the beginning of the establishment, the Department of Electrical Engineering was named as “Jurusan Listrik” consisted of two fields of studies: Electrical Power and Electronics & Telecommunication. Since 1984, “Jurusan Listrik” has been changed to “Jurusan Elektro”, which has been named again as The Department of Electrical Engineering in 2004. Initially there are five streams available in this department, namely: (1) Electrical Power Engineering, (2) Electronics Engineering, (3) Telecommunication Engineering, (4) Control Engineering, (5) Computer Engineering. Since 2006, computer engineering stream became a new study program: Computer Engineering Study Program (CESP) in the Department. In 2016, a new stream namely Biomedical Engineering is officially established.

THE OBJECTIVE OF EDUCATION

The objective of the Electrical Engineering education is to produce graduate who is able to propose solutions to electrical engineering related problems based on professional ethics.

VISION AND MISSION

The department has the vision to become a high standard of excellence in education and research in the field of electrical engineering. In order to achieve such vision, the department has defined its mission to produce Electrical Engineering graduates who are able to compete beyond the national labor market. The graduates will be capable to respond to the vast growing engineering technology development though the support of excellent educational process, excellent management and organization, international standard of competence of the teaching staff and international reputation in specific research activities.

THE TARGETS

Bachelor of Electrical Engineering

1. Able to design of the hardware.
2. Able to design of the software.
3. Able to handle general issues and specific in electrical engineering.
4. Able to apply the basic principles of mathematics, physics, and statistics in solving electrical engineering.
5. Capable of critical thinking, creative, and innovative and have the intellectual curiosity to solve problems at the level of the individual and the group.
6. Able to identify varieties of entrepreneurial efforts that are characterized by innovation and self-reliance based on ethics.
7. Able to use the language both spoken and written in the Bahasa Indonesia and English for academic or non-academic activities.
8. Able to provide alternative solutions to problems that arise in the environment, society, nation, and country.
9. Able to utilize information communication technology (ICT).

Bachelor of Computer Engineering

1. Able to design system, component, and process based on needs in a variety of areas of life.
2. Able to design information networks.
3. Able to design a computer-based system.
4. Able to make algorithm and implement it into programming.
5. Able to apply the basic principles of mathematics, physics, and statistics in solving computer engineering.
6. Able to use the language both spoken and written in the Bahasa Indonesia and English for

academic or non-academic activities.

7. Have integrity and are capable of critical thinking, creative, and innovative and have the intellectual curiosity to solve problems at the level of the individual and the group.
8. Able to utilize information technology communication.
9. Able to provide alternative solutions to problems that arise in the environment, society, nation, and country.
10. Able to identify varieties of entrepreneurial efforts that are characterized by innovation and self-reliance based on ethics.

Master of Electrical Engineering

1. Able to model electrical engineering system into mathematical equations
2. Able to formulate the problem solving in electrical engineering with the proper research methods
3. Able to produce innovative independent scientific work
4. Able to apply concepts of professional management in the field of electrical engineering

ELECTRICAL ENGINEERING STAFFS

Head of Department:

Ir. Gunawan Wibisono, M.Sc., Ph.D

Head of Electrical Engineering Study Program

Ir. Gunawan Wibisono, M.Sc., Ph.D

Head of Computer Engineering Study Program

Dr. Muhammad Salman, ST., MIT.

Vice Head of Department:

Dr.Eng. Arief Udhiarto, S.T., M.T.

HEAD OF LABORATORY

Head of High Voltage and Electrical Measurement Laboratory:

Ir. Amien Rahardjo, MT.

Head of Electrical Power Conversion Laboratory:

Ir. I Made Ardita, MT.

Head of Electrical Power System Laboratory:

Prof. Dr. Ir. Iwa Garniwa M. K., M.T.

Head of Electronics Laboratory:

Dr. Agus Santoso Tamsir, MT

Head of Control Laboratory:

Dr. Ir. Feri Yusivar, M.Eng.

Head of Digital Laboratory:

Prima Dewi Purnamasari, ST., MT., M.Sc.

Head of Telecommunication Laboratory:

Dr. Fitri Yuli Zulkifli, M.Sc

Head of Optoelectronics Laboratory:

Dr. Ir. Retno Wigajatri, MT.

Head of Computer Networks Laboratory:

Dr. Muhammad Salman, ST., MIT.

MAILING ADDRESS

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BOARD OF PROFESSORS

- Prof. Dr. Ir. Harry Sudibyo S.**, harisudi@ee.ui.ac.id (Ir., Universitas Indonesia, 1979; DEA., Univ. Paris VI, 1984; Dr. Ing., Univ. Paris VI, France, 1987; Prof., UI, 2007) Microelectronics & VLSI design.
- Prof. Ir. Rinaldy Dalimi, M.Sc, Ph.D.**, rinaldy@ee.ui.ac.id (Ir., Universitas Indonesia, 1980; M.Sc., Michigan State Univ., USA, 1989; Ph.D., Virginia Tech., USA, 1992; Prof., UI, 2007) Electrical power system analysis, energy management.
- Prof. Dr. Ir. Eko Tjipto Rahardjo**, eko@ee.ui.ac.id (Ir., Universitas Indonesia, 1981; M.Sc., University of Hawaii, USA, 1989; Ph.D., Saitama University, Japan, 1996; Prof., UI, 2005) Electromagnetic, antenna and wave propagation, microwave.
- Prof. Dr. Benyamin Kusumoputro, M.Eng.** kusumo@ee.ui.ac.id (Drs., Fisika ITB, 1981; M.Eng., Tokyo Inst. Tech., Japan, 1984; Dr., Tokyo Inst. Tech., Japan, 1993; Prof., UI, 2004) Computation intelligence, robotics.
- Prof. Dr. Ir. Rudy Setiabudy, DEA**, rudy@ee.ui.ac.id (Ir., Universitas Indonesia, 1982; DEA, INPG Grenoble, France, 1987; Dr., Montpellier II USTL, France, 1991; Prof., UI, 2008) Electrical material technology, electrical measurement.
- Prof. Dr. Ir. Dadang Gunawan**, guna@ee.ui.ac.id (Ir., Universitas Indonesia, 1983; M.Eng., Keio University, Japan, 1989; Ph.D., Tasmania University, Australia, 1995; Prof., UI, 2004) Signal processing and compression, multimedia communication.
- Prof. Dr. Ir. NR. Poespawati, MT.**, pupu@ee.ui.ac.id (Ir., Universitas Indonesia, 1985, MT., Universitas Indonesia, 1997, Dr., Elektro FTUI, 2004; Prof., UI, 2008) Solar cell devices, laser.
- Prof. Dr. Ir. Iwa Garniwa MK, MT.**, iwa@ee.ui.ac.id (Ir., Universitas Indonesia, 1987; MT., Universitas Indonesia, 1998; Dr., Elektro FTUI, 2003; Prof., UI, 2009) High voltage and current, electrical materials.
- Prof. Dr.-Ing. Kalamullah Ramli, M.Eng.**, k.ramli@ee.ui.ac.id (Ir., Universitas Indonesia, 1993; M.Eng., Univ. of Wollongong, Australia, 1997; Dr.-Ing, Univ. Duisburg-Essen, Germany, 2003, Prof., UI, 2009) Embedded systems.
- Prof. Dr. Ir. Riri Fitri Sari, M.Sc., MM.**, riri@ee.ui.ac.id (ST., Universitas Indonesia, 1994; M.Sc., Sheffield, 1998; PhD., Leeds Univ., UK, 2004, Prof., UI, 2009) Software engineering, active networks, pervasive computing.

INTERNATIONAL ADJUNCT PROFESSORS

- Prof. Dr. Fumihiko Nishio**, fnishio@faculty.chiba-u.jp (Fundamental Research Field of Remote Sensing: Snow and Ice), Center for Environmental Remote Sensing (CEReS), Chiba University, Japan.
- Prof. Dr. Josaphat Tetuko Sri Sumantyo**, jtetukoss@faculty.chiba-u.jp (Fundamental Research Field of Remote Sensing: Microwave Remote Sensing), Center for Environmental Remote Sensing (CEReS), Chiba University, Japan.
- Prof. Dr. James-Holm Kennedy**, jhk@pixi.com (Electronic & optical beam management devices, micromechanical sensors, chemical & biochemical sensors, novel electronic devices, force sensors, gas sensors, magnetic sensors, optical sensors.), University of Hawaii, USA.
- Prof. Dr.-Ing. Axel Hunger**, axel.hunger@uni-due.de (Adaptive e-Learning, adaptive instructional systems, e-course and its applications, pedagogical analyses of on-line course), University of Duisburg Essen, Germany.
- Prof. Dr. Koichi Ito** (Printed Antenna, Small Antenna, Medical Application of Antenna, Evaluation of Mutual Influence between Human Body and Electromagnetic Radiations), Chiba University, Japan.
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FULL-TIME FACULTY

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1.5.4. DEPARTMENT OF METALLURGY AND MATERIALS ENGINEERING

GENERAL

Department of Metallurgy was originally established as a study program under Faculty of Engineering, Universitas Indonesia in 1965. Due to the lack of qualified lecturers and infrastructure, the first academic activity was only attended by 25 students. For almost 6 years since 1969, the department had stopped accepting new students and focusing the activity to the existing students. In 1975, the department began to accept students again, and in the same year produced the first 7 graduates. Ever since, the department kept continuing and developing its academic activities.

As the science and technology progresses, especially for the engineering materials-based industries, also considering the availability of resources within the department, Department of Metallurgy consolidated its resources and studied the need to add “materials” to the name. Following the idea, on November 5th 2002, Rector of Universitas Indonesia then decreed Department of Metallurgy and Materials Engineering as one of the departments within the Faculty of Engineering.

The curriculum in Metallurgy and Materials Engineering is structured to address problems associated with the metallurgy and design of materials and materials processing to meet the specific needs for a variety of industries. Emphasis is on the basic sciences and principles of engineering with applications of these principles to metallurgy and materials behaviors. The students must obtain a broad foundation in chemistry, physics, and mathematics, which is applied in engineering courses. Within metallurgy and materials engineering courses, students obtain a foundation in the major areas of metallurgy and materials science and to the major classes of engineering materials, which is applied in courses in materials properties and selection, computational methods and in capstone design course. Students gain in-depth experience in another engineering discipline through coordinated technical elective sequences.

In 2016, the department has totally graduated almost 2300 graduates with a degree in bachelor of engineering, 163 graduates with a degree in master of engineering, and 25 graduates with a doctoral degree. At the beginning of first semester of 2016/2017, the department has actively 479 undergraduate students from regular and parallel program, 57 students from undergraduate international program, 71 master students, and 13 doctoral students. Considering the high demand to produce qualified graduates and following current trends toward the global competition, Department of Metallurgy and Materials Engineering is committed to continuously improve its academic activities including teaching and learning process as well as research activities. As a part of national education system, which has the objective to develop the intellectual life of the nation through human resources development by conducting three main activities known as tridharma (“three duties”), the department is also committed to carry out higher level educations, to conduct scientific research, and to provide community services.

During its development stage, the Department of Metallurgy and Materials Engineering has achieved several milestones, such as:

- Grade A Accreditation for Undergraduate Program from National Accreditation Board, Ministry of National Education (Year 2013 and 2018).
- Establishment of master (1995) and doctoral (2008) programs.
- Grade A Accreditation for Master Program from National Accreditation Board, Ministry of National Education (Year 2014 - 2019)
- Grade A Accreditation for Doctoral Program from National Accreditation Board, Ministry of National Education (Year 2012 - 2017)
- Establishment of “Dual-degree” International Program with Monash University (2003).
- Grant awards from the Government of Republic Indonesia for:
 - Internal Improvement for non-metallic field competence - PHK-A4 (2004)
 - Improvement for external and regional competence - PHK-A2 (2004-2006)
 - Internationalization of academic and research activities in information technol-

ogy, energy and nonmaterial - PHKI (2010-2013)

- Establishment of Center for Materials Processings and Failure Analysis (CMPFA), a venture unit to support the materials engineering community and industry (2001).
- Intensive academic and research collaborations with international institutions, such as Monash University (Australia), Kagoshima University (Japan), Nanyang Technological University (Singapore), Yeungnam University and KITECH (Korea) (since 2006).
- Materials Testing Laboratory was accredited ISO 17025 (2011)

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VISION AND MISSION OF THE DEPARTMENT OF METALLURGY & MATERIALS ENGINEERING

Vision

In line with the vision and mission of Universitas Indonesia and Faculty of Engineering, the vision of the Department of Metallurgy and Materials Engineering is “As a research-based center of excellence, as well as referral center and solution provider for problem in the field of metallurgy and material engineering both nationally and globally.”

Mission

To achieve such a vision, Department of Metallurgy and Materials Engineering put its mission:

- Providing broad access to education and research for the public and industry society
- Producing high quality graduates with strong academic background and comprehensive skills in process technology, material engineering and design, and are capable of playing active and dynamic role in national, regional and international communities
- Conducting quality Tridharma (three duties) relevant to the national and global challenges
- Creating conducive academic environment to support the vision of Department of Metallurgy and Materials Engineering

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Dr. Ir. Sri Harjanto

Vice Head of Department

Dr. Deni Ferdian, ST, M.Sc.

HEAD OF LABORATORY

Head of Chemical Metallurgy Laboratory:

Dr. Ir. Rini Riastuti, M.Sc.

Head of Physical Metallurgy Laboratory:

Prof. Dr. Ir. Winarto, M.Sc (Eng)

Head of Mechanical Metallurgy Laboratory:

Ir. Bambang Priyono, MT

Head of Processing Metallurgy Laboratory:

Dr. Ir. Dwi Marta Nurjaya, MT

Head of Metallography & Heat Treatment Laboratory:

Dr. Ir. Yunita Sadeli, M.Sc

Head of Corrosion & Metal Protection Laboratory:

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STUDY PROGRAM

Department of Metallurgy & Materials Engineering manages the course program as follows:

- Under-graduate Program (S1 Program) of Metallurgy & Materials Engineering.
- Magister Program (S2 Program) of Metallurgy & Materials Engineering
- Doctoral Program (S3 Program) of Metallurgy & Materials Engineering

1.5.5. DEPARTMENT OF ARCHITECTURE

GENERAL

Department of Architecture at the Universitas Indonesia (formerly known as Architectural Engineering Major) was established in 1965 under the UI Faculty of Engineering (FTUI) in Jakarta (established a year earlier through Presidential Decree No. 76 dated July 17, 1964). In the early days, education at the FTUI Architectural Engineering was done through a system of per-level or per-year full professional education. The average completion time was 7 years with an Engineer (Ir.) degree. Then in 1978, the Semester Credit System (SKS) went into effect with a minimum number of acquired semester credit units of 160 credits. The average duration of the study was five years, and the title was still Engineer (professional education). Since 1996, a four-year bachelor's education program was implemented with a total of 144 credits, producing an academic degree Bachelor of Engineering (ST). In the same year, after 31 years of existence, Architecture Program of Study at UI received its decree by the Directorate General for Higher Education No. 215/DIKTI/ KEP/1996 dated July 11, 1996.

In 2000, Department of Architecture streamlined the 1996 curriculum by publishing the 2000 Curriculum along with the application of problem-based learning method, collaborative and student-centered learning. The 2000 Curriculum stated clearly, that the direction for bachelor's architecture education is pre-professional.. In the same year, Master of Architecture program was established with 2 streams , namely Architectural Design and Urban Design. Over the years, the master's program has grown into 6 streams, in addition to the two already mentioned earlier, the specialization program of Urban Housing and Settlements, Real Estate, History and Theories of Architecture and Urbanism and Building Technology and Sustainability were established. At this time, through the new curriculum (2012 Curriculum), the six specializations were streamlined into three which are:

- Creative process stream: Architectural Design, Urban Design, Property Development
- Humanities stream: History and Theories of Architecture, Urban Housing and Settlement
- Technology and sustainability stream: Architecture and Technology

In 2004, Architectural Engineering Major changed to Department of Architecture. The degree for its graduates was also altered from Bachelor of Engineering (ST) to Bachelor of Architecture (S.Ars) for the bachelor graduates and Master of Architecture (M.Ars) for the master's. From 2000 until 2012, the Department of Architecture went through several changes in Curriculum and thus the curriculum is integrated and emphasize several points:

1. Flexibility in following the development of science and technology.
2. Curriculum that responds in fulfilling the demands of professionals within national, regional and also international level.
3. Referring to the National Education System based on Competence. The core of the curriculum is in respect to the profession of architect in collaboration with IAI, and refers to UIA as the international standards..

In 2008 a new study program, Interior Architecture Undergraduate Program is opened), which emphasizes the of interiority aspects of the design in architecture. The opening of this Interior Architecture study program allows the opportunity to explore and develop the field of interior architecture in Indonesia.

In 2009 a PhD program and a one-year program of Professional Program of Architect (PPAR) are set. Ph.D program is intended to strengthen the Department of Architecture as a leading architectural research-based institution. PhD student's research is focused on two areas: major research areas (research based on architectural issues) and minor research area (related to specialized area of study) in which PhD program students have the opportunity to take courses outside the discipline of architectural discipline to specifically support the knowledge, thoughts, and methods of its major. The learning process is conducted through the exploration of the width and depth aspects of knowledge about the studied issues. Meanwhile, for PPAR, the education is carried in a year to

complete graduates with the actuality of professional architecture practice. Graduates of PPAR are also allowed to transfer the credit in UI to continue for a master degree in architecture.

Department of Architecture has also commenced an International Class (KKI) of undergraduate degree in architecture, with single degree program (only one semester abroad), or a double degree program (4 semesters in UI and the rest abroad). This program is in collaboration with leading universities in the world such as the Queensland University of Technology (QUT), Curtin University (Australia), University of Florida and Politecnico di Milano (Italy). In addition, S1 students who have excellent academic achievements are able to attain a Fast-Track program (4 years bachelor + 1 year master), a total of 5 years, to accomplish a Master Degree in Architecture..

The Department of Architecture UI has an A accreditation from the Higher Education BAN, Indonesian Ministry of Research and Higher Education.). The Undergraduate Program Department of Architecture program has been also assessed by the ASEAN University Network (AUN) in 2010. For more profiles of FTUI Department of Architecture can be viewed at the website: <http://architecture.ui.ac.id>.

VISION and MISION

VISION

Toward an excellent architectural education institution with regional and international recognition.

MISSION

To deliver excellent architectural education that leads the development of architectural knowledge and promotes meaningful application of knowledge for the society.

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PART-TIME FACULTY

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AA Ayu Suci Warakanyaka

(S.Ars, Architecture Universitas Indonesia; MFA, Interior Architectural Design University of Edinburgh) Interior Architectural Design

Anna Zuchriana

(S.Sn, Seni Grafis Jakarta Arts Institute/IKJ; MSn, Jakarta Arts Institute/IKJ, Jakarta). Fine Arts, Graphics Arts.

Arif Rahman Wahid

(S.Ars., Architecture Universitas Indonesia; MA Narrative Environments Narrative Environment, Interior Architecture

Ary Dananjaya Cahyono

(S.Sn, Seni Patung Bandung Institute of Technology; MFA Glasgow School of Arts) Visual Arts, Sculpture

Azrar Hadi

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Cut Intan Djuwita

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Interior Design

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(B.Arts in Architecture UC Berkeley California, USA; MSc in Architecture Carnegie Mellon University, Pittsburgh, USA; Master of International Policy and Practice George Washington University, USA) Architectural Design, Sustainability in Architecture

Endy Subijono, Ar.

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Farid Rakun

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Ferro Yudhistira

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Finarya S.Legoh

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Iriantine Karnaya

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Ratna Djuwita Chaidir

(Dra., Psychology Universitas Indonesia; Dipl. Pschy, Daarmstaat, Germany) rchitectural Psychology

Siti Handjarinto

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Siti Utamini

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Sukisno

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Sri Riswanti

(Dra, Interior Design, FSRD, ISI Yogyakarta; M.Sn, Seni Urban dan Industri Budaya, Jakarta Arts Institute/IKJ) Interior Design, Communication Techniques in Architecture & Interior.

Subandinah Priambodo

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Tri Hikmawati

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Widyarko

(S.Ars, Arhitecture Universitas Indonesia; M.Ars, Universitas Indonesia).Building Technology and Materials

1.5.6. DEPARTMENT OF CHEMICAL ENGINEERING

GENERAL

The main mission of the Chemical Engineering Department is to provide the highest quality education so that graduates have the necessary knowledge, skills, and experience conducting research with current topics in the field of chemical engineering and biochemical engineering. Starting from the opening of the Gas Engineering Program in 1981, Chemical Engineering Department at UI is now one of the leading chemical engineering departments in Indonesia having excellent accreditation from National Accreditation Board of Indonesia (BAN) and the ASEAN University Network (AUN). Chemical Engineering Department has two study programs, Chemical Engineering (PSTK) and Bioprocess Technology (PSTB), 30 permanent academic staff and about 800 undergraduate and graduate students. In order to enhance the role of the department in the era of biotechnology and life sciences, PSTB was opened in 2008.

Chemical engineering department offers five academic programs: undergraduate program (regular, parallel, international), master program (regular and gas management at Salemba campus), and doctoral program. The chemical engineering department has been adhering to competency-based principles starting in curriculum 2000 up to the recently updated curriculum 2012. The present graduate competencies are based on those recommended by ABET and the Bologna Process and on feedbacks from graduates and industry representatives, aiming at producing graduates who are educated and able to contribute effectively to their communities wherever they choose to live and work. The chemical engineering department is conducting international classes in collaboration with three Australian universities: Monash University, Curtin University and University of Queensland. Students in this international class spend their first four semesters at UI, and spend the subsequent four semesters in Australia. At the end of their study, students will get a Sarjana Teknik degree from UI and a Bachelor of Engineering degree from the partner university. Since 2011, international program students may choose to enroll in a single-degree program at UI following a curriculum that is equivalent to the regular undergraduate curriculum. The department also has established double degree master programs with National Taiwan University of Science and Technology (NTUST) and Curtin University. In this double degree programs, students spend their first year at UI and the second year at NTUST or Curtin University. At the completion of their studies, students will be awarded a Master of Engineering degree from NTUST or Curtin University.

The updated curriculum is now more streamlined and integrated allowing students to take elective courses previously only available in a study program (PSTK or PSTB) or available for a certain level (undergraduate or graduate). It means that students could choose courses that are more suitable to their interest. For those who qualify, there is a fast-track program that allows undergraduate students to obtain both bachelor and master degrees in ten semesters instead of in twelve semesters. Chemical engineering master's program has also prepared a special curriculum for those without an educational background not in chemical engineering. By adopting this special curriculum, applicants with a non-chemical engineering degree are recommended to take the chemical engineering undergraduate core courses to master the fundamentals of chemical engineering before taking more advanced core graduate courses. Graduates of doctoral programs are expected to contribute to the development of science by conducting independent research, usually under supervision of a qualified professor.

Chemical engineering department as one of the departments in the Faculty of Engineering, University of Indonesia has taken part in a research effort with the theme "Sustainable chemical and bioengineering for energy and product development". This research theme is supported by four research groups: chemical and natural product design, sustainable energy, industrial bioprocess technology, and process intensification. Research activities conducted at the Chemical engineering department has received a lot of government funding to support the research activities of students.

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VISION, MISI AND OBJECTIVES OF CHEMICAL ENGINEERING DEPARTMENT - FTUI

Vision

“To become a world class Chemical Engineering Department as center of excellence for education and research in chemical engineering.”

Mision

The Department seeks to provide the best quality of undergraduate and postgraduate education. The Department will provide a broad-based education and design experience, enabling students to address chemical engineering problems. Furthermore, the Department will provide students with fundamental elements to develop in the profession in response to rapidly changing technology and societal needs and expectations, and, will also develop important soft skills such as problem solving, communication, and group skills.

STAFF OF THE DEPARTMENT OF CHEMICAL ENGINEERING

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Vice Head of Department

Prof. Dr. Ir. Nelson Saksono, MT

Head of Chemical Engineering Study Program :

Prof. Ir. Sutrasno Kartohardjono, M.Sc, PhD

Head of Bioprocess Engineering Study Program

Dr. Dianursanti, ST., MT

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1.5.7. DEPARTMENT OF INDUSTRIAL ENGINEERING

GENERAL

Industrial Engineering Education is an answer to a growing need of industrial engineers who have the capabilities of managing production or operations process efficiently and effectively to achieve excellence. Industrial Engineers should be one of the backbones for transforming our national industry to be more competitive and contribute to our nation's welfare. The scope of the term industry is for both service and manufacturing industry.

Industrial Engineering Program was actually formed in the mid 1970s as a part of Mechanical Engineering Department, due to the market needs for a specialized mechanical engineers which defines the current definition of industrial engineers. In 1998, based on Decree by Higher Education Director No 207/DIKTI/Kep/1998 dated June 30 1998, the Industrial Engineering Department was born. With the new status as department, the program had more autonomy and opportunity to enhance the Industrial Engineering Discipline in Indonesia.

After 10 years as an independent Department, Industrial Engineering has been recognized by the national public and industry as one of the forefronts industrial engineering education in Indonesia. This is shown by the high demand and acceptability of our graduates. Today, our graduates have been accepted not only in the manufacturing industry but also service industry such as governments, hospital, financial service, consulting, information technology and many others. In the manufacturing area, we have graduates in charge of production or operations management, human resource development, maintenance, inventory and logistics, and many more.

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VISION and MISSION

Vision

“ To be a premier industrial engineering higher education institution with good national and international reputation in providing high quality graduates and researches.”

Mission

- Establishing education to provide high quality graduates accepted by national and international industry
- Fostering researches to answer the needs of national industry
- Harnessing the knowledge of industrial engineering for the welfare of the society

STAFF OF THE DEPARTMENT OF INDUSTRIAL ENGINEERING

Head of Department:

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Vice Head of Department:

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Head of Laboratory

Head of Manufacturing System Laboratory:

Prof. Dr. Ir. T. Yuri M. Zagloel, MEngSc

Head of Human Factors Laboratory:

Ir. Boy Nurtjahyo, MSIE

Head of System Engineering Modeling and Simulation Laboratory:

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Head of Statistics and Quality Engineering Laboratory:

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Head of Product Development and Innovation Laboratory:

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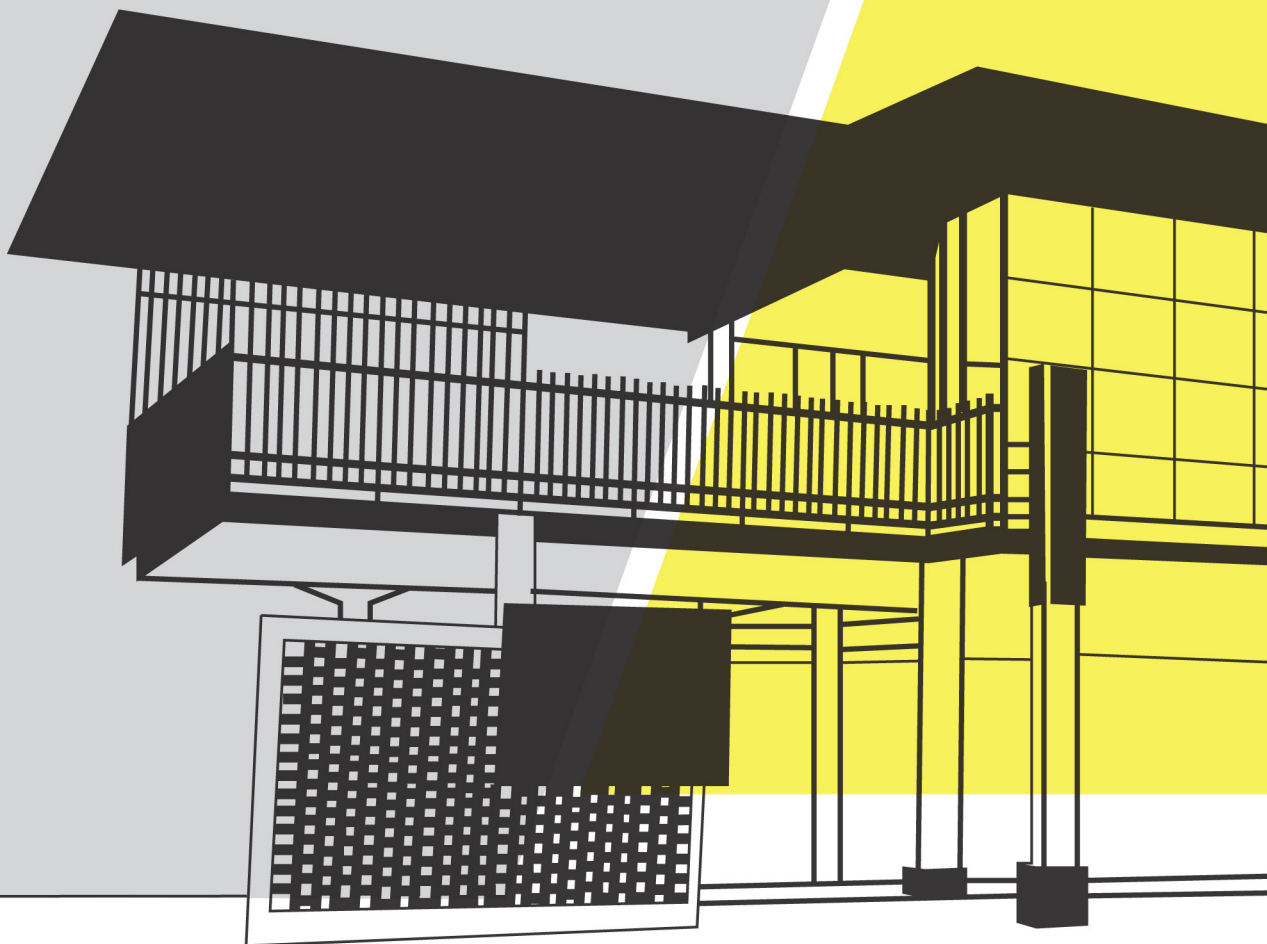
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ACADEMIC SYSTEM AND REGULATION



2. ACADEMIC SYSTEM AND REGULATION

The educational system in the Faculty of Engineering, Universitas Indonesia refers to the prevailing system of education at Universitas Indonesia.

2.1. GENERAL

Teaching and Learning Activities

One semester is the time of the activity consisting of 16-18 weeks of lectures or other scheduled activities, including various additional activities such 2-3 week assessment activities. These teaching and learning activities are in form of lecture, lab, studio, exams, quizzes, assignments, presentations, seminars, research, practical work, industrial visits, and a thesis.

Semester Credits Units (SKS)

Education in the Faculty of Engineering, Universitas Indonesia is held in a variety of ways such as lectures, assignments (ex: calculation tasks, planning, design), practical work, seminars, lab, studio, and research for thesis writing. All educational activities that must be undertaken by each student to earn a bachelor's degree are contained within the academic loads and measured in units of semester credit (SKS).

Semester Credit is a measurement on the learning experiences obtained by students on each semester.

One Semester Credit in lecture, responses and tutorials, includes: face to face study time for 50 (fifty) minutes per week per semester; structured learning activities with structured assignments for 60 (sixty) minutes per week per semester; and independent study session for 60 (sixty) minutes per week per semester.

One Semester Credit in seminar or other similar subjects, includes: face to face study time for 100 (one hundred) minutes per week per semester, independent study session of 70 (seventy) minutes per week per semester.

One Semester Credit in practical training, studio, workshop, on the field training, research and community services, and /or other similar subjects for 170 (one hundred and seventy) minutes per week per semester.

Activities for one semester consist of 16-18 weeks of lectures or other scheduled activities and its additional activities. Also included in the schedule are two weeks of midterm examination and another two weeks for final examination.

All educational activities must be performed by each student to earn a bachelor's degree is an academic load of 144-145 credits divided into 8 (eight) semesters. Undergraduate students with an average study load of about 18-20 credits per semester are expected to undergo a week of minimal 18 -20 hours of scheduled interaction with a lecturer, 18-20 hours of structured activities, and 18-20 hours of independent learning activities.

Subjects

Subjects in the FTUI's undergraduate curriculum are grouped into University General Subjects (12,5%), Basic Engineering Subjects (15-20%), Basic Skills Subjects (30-35%), Core Subjects (35-40%). Subjects can be categorized as compulsory subjects and electives. They can be taken across departments or across faculties.

Grade Point Average

Grade Point Average or GPA is used to evaluate students' performance either for a particular semester in term of Indeks Prestasi Semester (IPS) or Semester Performance Index, or, cumulatively for all of the semester up to the most recent one in term of IndeksPrestasiKumulatif (IPK) or GPA. The formula used to calculate either IPS or IPK is as follows:

$$\text{GPA} = \left(\frac{\sum_{\text{courses}} (\text{Grade Point Value} \times \text{Semester Credit Unit})}{\sum_{\text{courses}} \text{Semester Credit Unit}} \right)$$

The summation made by multiplying the weight of credits with a letter grade for each course, divided by the number of credits.

Semester Performance Index / Indeks Prestasi Semester (IPS)

The Semester Performance Index is calculated from all subjects taken in each semester, except for subjects with letter grade of BS, I, and TK. Achievement Index that takes into account all of the subjects for a certain semester is called the Semester Performance Index (IPS) and used to determine the maximum academic load that the student may take in the upcoming semesters.

Grade Point Average (GPA/IPK)

If the calculation involves the entire grade point value of subjects taken during the educational program period, the result of the summation is a Grade Point Average (GPA) that is used as a basis for study evaluation. Courses taken into account are the ones listed in the Study Plan Form (FRS). GPA is obtained from the summation of all subjects having a grade of C or higher from the first semester until the last semester, with the exception of subjects with letter grade of BS, I, and TK.

Academic Performance Evaluation

Assessment of academic ability is performed on an ongoing basis by assigning tasks, homework, quizzes, or exams which are given throughout the semester. For each subject, there are at least two components of assessment which may include a midterm exam (UTS) and a final exam (UAS). A student will be assessed on his academic ability if he meets the following requirements:

- The courses taken have been registered and verified by Academic Advisor during the academic registration period.
- The student has fulfilled all of the administrative and academic requirements for the ongoing semester.
- The student has completed all of the required academic assignments.

Grades

At the end of each semester, students may download Semester Grade Record as a report on their academic performance from SIAK NG. Assessment of study efficacy is carried out using letters and academic load in accordance with Table 2.1.

Table 2.1. Grade Value and Points

Grade Value	Marks	Grade Point
A	85 - 100	4,00
A-	80 - < 85	3,70
B+	75 - < 80	3,30
B	70 - < 75	3,00
B-	65 - < 70	2,70
C+	60 - < 65	2,30
C	55 - < 60	2,00
D	40 - < 55	1,00
E	0 - < 40	0,00

The highest grade is A with grade point of 4.00 and the minimum passing grade of a course is C with grade point of 2.00. The instructor may assign the 'Incomplete' (I) grade if the student has not made a reasonable attempt to complete major session assignments, laboratory projects and the lecturer has made a reasonable effort to inform the student as early as possible that an important part of session work is incomplete. The 'I' mark should be changed to other grade within 1 month, otherwise, it will be automatically changed to 'E' grade. The "T" mark is given for no attendance in exam. The "BS" mark is given for Special Lecture (such as Internship, Seminar & Final Project) that has not been completed. These BS courses are not taken into account in the calculation of Semester Study Unit, IPS and GPA.

Length of Study and Academic Load

Undergraduate Program

The academic load a student can take is determined by the Academic Counselor based on the previous Semester Performance Index (IPS) as stated in the Study Plan Form (FRS). Students must take the entire allocated credits of the entire courses in the first and second semester. Academic Load for Undergraduate Program is 144 (one hundred and forty four) credits including final assignment and maximum academic load is 160 (one hundred and sixty) credits including final assignment and can be completed in minimum 7 (seven) semesters and maximum of 12 (twelve) semesters.

As for the second semester, these following rules apply:

- For students obtaining an IPS of 2.00 or less, they must take all credits load allocated for the second semester according to the structure of the applicable curriculum.
- For students obtaining an IPS of 2.00 or more, the maximum credits that can be taken follow that of the provisions in the Maximum Credit Load Table.
- From the 3rd semester onwards, the maximum credit loads that may be taken is determined by IPS of the previous semester and follow provisions in Maximum Credit Load as shown in Table 2.2 with respect to course prerequisites (if any). If necessary, Academic Counselor (PA) can add a maximum of 2 credits more than the provision in the Table through the approval of the Vice Dean.

Table 2.2. Maximum study load in a semester for undergraduate program

IPS	Maximum SKS
< 2,00	12
2,00 - 2,49	15
2,50 - 2,99	18
3,00 - 3,49	21
3,50 - 4,00	24

Master Program

Academic load in the FTUI's Master Program curriculum is 40-44 credits after finishing the undergraduate program with the following study period:

- For Regular Master Program, the length of study is scheduled for 4 (four) semesters and can be completed in at least 2 (two) semesters and a maximum of 6 (six) semesters.
- For Non-Regular Master Program, the length of study is scheduled for 5 (five) semesters and can be completed in at least 3 (three) semesters and a maximum of 7 (seven) semesters.

Academic Load for each semester is set by the Academic counselor (PA) based on the IPS of the last semester as stated in the Semester Grade list (DNS). Provisions on the academic load are as follows:

- A semester's academic load is registered by a student as he carries out online registration according to the pre-determined schedule. Students are required to take all subjects as allocated in the first semester curriculum.
- For students with less than a 2,5 IPS, a provision stating that the number of credits taken for the following semester does not exceed 9 credits is applicable.
- The maximum number of credits that can be taken on Master Program is 16 (sixteen) credits (for Regular Master Program) and 12 (twelve) credits (for Non Regular Master Program) per semester.

Exemption from the provisions of academic load should be with the permission of the Vice Dean.

Matriculation for Master

The Matriculation Program is aimed to synchronize the students' ability to achieve the minimum requirements to continue in the Master Program in the Faculty of Engineering Universitas Indonesia. Matriculation is done by taking classes of subjects required by each Faculty/ Study Program within the Curriculum of Undergraduate Program. The allowed credit load for this Matriculation program is 12 (twelve) credits that can be completed in 1 (one) or 2 (two) semesters. Students are allowed to continue their study in the Master Program only if they passed all Matriculation subjects within the maximum of 2 (two) semesters allowed with a Matriculation GPA of 3,00 (three point zero).

Doctoral Program

Academic load in the FTUI's Doctoral Program curriculum is 48-52 credits after finishing the Master Program, including 40 credits of research activities. A semester's academic load is registered by the student through online academic registration during a pre-determined schedule. New students are required to take all subjects as allocated in the curriculum for the first and second semesters. Students must re-take research courses with a BS grade from previous semesters. Student's Academic Load for each semester is established by the Academic Advisor (PA) or the doctorate Promoter based on a discussion with the student from the doctoral program.

The length of doctoral program for all scheduled courses is 6 (six) semesters and in its implementation can be completed in at least 4 (four) semesters and maximum of 10 (ten) semesters. Students in the Doctoral Program may be granted an extension of study period up to a maximum of 2 (two) semesters if their study time have never been extended before, have achieved a minimum grade of B for Research Result Examination, and obtained a recommendation from their promoter and a guarantee that they will complete their study within the granted extended study period. The proposal for such extension is regulated through a Rector's decree based on proposal from the Dean/ Director of School.

Undergraduate Thesis / Final Project

Undergraduate Thesis is mandatory course for undergraduate students of Faculty of Engineering UI. The course is the application of science that has been obtained in accordance with the basic scientific disciplines that the student has studied, in the form of scientific paper, engineering design, assembly or models and accessories. Undergraduate thesis is mandatory to complete the requirements in order to earn a degree in the field of engineering. Undergraduate Thesis status is equivalent to other skill courses is tailored in accordance with the scope of each study program. Undergraduate Thesis must meet certain requirements, both academic and administrative requirements. Students are allowed to start composing undergraduate thesis if:

- The Undergraduate Thesis has been registered in the Study Plan Form [FRS]
- Students have obtained a minimum of 114 credits with a minimum of grade of C and have passed all mandatory courses both in the faculty and university level.
- Students have fulfilled all prerequisites set by the Study Program.

Undergraduate Thesis can be taken in both odd and even semester in the running academic year. On SIAK NG system, student must fill out the name of his thesis supervisor and the title of thesis which will be verified by the Vice Head of the Department. At the end of the semester, the Undergraduate Thesis supervisor will submit the student's thesis's grade to SIAK NG and change the title of undergraduated thesis (if necessary). The completed undergraduated thesis must be submitted in the form of hard-covered book and CD within the pre-determined time limit. The undergraduate thesis must first be assessed in an undergraduated thesis examination by the supervisor and examiners assigned by the Head of the Department.

Thesis (Master Program)

Thesis is a report of the results of research activities in the form of scientific writing. The thesis topic should be a summary of the subject matter that can be scientifically studied on the basis of the theory and use of certain methods. Thesis should be written in Bahasa with an English abstract. For Master program students who are given the opportunity to conduct research and thesis preparation abroad, they are allowed to write thesis in English with abstracts in the Bahasa, while still following the appropriate format stated in the Final Project Writing Guideline of Universitas Indonesia. Exemption of this rule applies only to study programs that hold a joint collaboration with university's abroad as stated in the charter of cooperation.

Requirements to start making Thesis are:

- Thesis has been registered in Study Plan Form [FRS] in every semester
- Students have passed courses with a load of 20 credits with a GPA \geq 3.00
- Head of the study program has set lecturer's name as a thesis supervisor.

Students are responsible for all thesis research costs. Students can actively meet with any of their lecturers as a potential supervisor, to request a thesis topic. In addition, in middle of the second semester, Head of the Study Program can start announcing thesis topics from which the students of the Master program could chose from to prepare the thesis proposal in the form of seminars. The Head of the Study Program announces a list of thesis supervisor who are assigned to guide the students in writing and finishing the approved topic. Thesis examination committee consists of Head of the committee, a minimum 3 or a maximum 5 examiners including the thesis supervisor. Responsible for the implementation of the thesis is the thesis coordinator in each department. Thesis counseling should be carried out with maximum of two people, Supervisor I and Supervisor II. Supervisor I should have a PhD or Master degree with a minimum of 5 years teaching experience and have expertise relevant to the student's thesis. Supervisor II should at least have a minimal master degree & have expertise relevant to the student's thesis.

Thesis can be submitted for a thesis examination when the thesis has met the following academic requirements:

- Thesis has been registered in Study Plan Form [FRS] in said semester
- The thesis has been declared eligible for examination by the Thesis Advisor
- Students have passed seminar examination and have met the requirements for thesis examination set by the study program.
- The thesis has been declared eligible for examination must be submitted to the Department to be listed in the examination schedule determined by the Head of the Study Program.
- Uploading of Summary of Undergraduate Thesis/Thesis/Dissertation

Dissertation

Dissertation preparation are done under the guidance and evaluation of Promoter with the following qualification: Full Time University Lecture; a Professor or Doctor with an academic title of Associate Professor; Have a relevant expertise with the Dissertation Topic; within the last 5 (five) years have written at least 1 (one) scientific paper published in an accredited national journal or a reputable international journal or 1 (one) other similar scientific work acknowledge by a team of expert appointed by the Academic Senate of Universitas Indonesia. Promoter may be assisted by a maximum of 2 (two) co-promoters from within the university, partner universities, or other institutions in cooperation with the promoter team. Co-promoter must have the following qualification: a full time or a part time lecture or an expert from other institution; hold a minimum title of Doctor/Ph.D with an academic title of a minimum Senior Lecture; Have a relevant expertise with the Dissertation Topic.

Internship

Internship is an out-of-campus activity to apply the scientific knowledge in a real work situation. Requirements for Internship is set up by each department and is part of the total 144 SKS. Students must find the place to carry out their internship themselves and departments will help by issuing a formal letter requesting the on-the-job training position.

For the undergraduate double degree program, students are required to complete internship when they are in the partner universities. For example in Australia internship is one of the requirements set by the Institute of Engineers Australia (IEAust) to obtain accredited B.E. (Bachelor of Engineering) degree. Internship is a good opportunity for students to apply their skills and build networks in the industry. It is strongly suggested that students should do their Internship in partner universities. However, if they cannot do so it in partner universities, they are allowed to do it in Indonesia with prior permission from partner university.

Supplementary Exam

Students are allowed to take a Supplementary Examination for Mid Term and Final Examination the following condition: Sick, Grievance; or representing Universitas Indonesia in a Competition. Students with Sickness excuse are obliged to submit the application for Supplementary Exam signed by their parents/guardian and a Medical Certificate from Doctor or Hospital where they was treated; Students with Grievance or death in the family (death to Father, Mother, Older or Younger Siblings) are obliged to submit the application for Supplementary Exam signed by their parents/guardian; Students representing

Universitas Indonesia in a Competition are obliged to submit a Letter of Assignments/ Letter of Reference stating the Competition which they represented UI in. The Supplementary Exam can only be done by a written consent from the Vice Dean for Academic, Research, and Student Affairs of Faculty of Engineering Universitas Indonesia.

Credit Transfer

Credit Transfer is a recognition process of a number of credits a student may obtained from a university after an evaluation process by a Credit Transfer Team on each Faculty /School in a University. Students who have registered and study at an undergraduate study program or other equivalent education programs, both within the Universitas Indonesia or in any other universities or through a Student Exchange or Study Abroad program, may apply for a Credit transfer, provided that: (i) the transferred credits contain the same material with the courses listed in the curriculum for undergraduate program in FTUI, (ii) the academic record must be dated not more than a maximum of 5 years from the credit transfer application date, (iii) if the academic record are obtained from other universities outside of the Universitas Indonesia, the university should have at least a “B” accreditation from the National Accreditation Board for Higher Education or other international accrediting agencies. The maximum academic load that can be transferred in an Undergraduate Program is a maximum of 50 (fifty) percents of the total academic load that a student is required to complete in accordance to the curriculum of the study program he/she is currently studying. The courses transferred will be indicated with “TK” mark in the academic transcript.

Credit Transfer procedure are as follows: (i) Student submit a letter requesting Credit Transfer to the Head of the designated department, (ii) The Head of the Department will form a team to recommend which courses the student has previously taken can be transferred, (iii) Recommendation will be sent to the Dean of FTUI, (iv) FTUI Dean issues the Credit Transfer Decree, (v) The Faculty’s Center of Administration assigned “TK” marks for all relevant courses in the student’s SIAK NG account.

Credit Transfer for Parallel Class Students of Diploma Graduates

Starting in 2011, all extension programs in FTUI were merged into Parallel Classes in the Undergraduate Program. Diploma graduates who are registered as a student in these parallel classes, credits obtained from the previous diploma program will be transferred in blocks of 38 credits. Students begin their study in the third semester by taking all academic load according to package provided for the third semester. Afterward, they can take credits in accordance with their IPS in the following semester.

Study Abroad

There are many opportunities available for undergraduate students, both from Regular and Parallel programs to participate in Student Exchange program abroad, such as in Japan, Korea, Taiwan, Singapore, and many other countries. Student exchange programs generally last for 1-2 semesters and is supported with a full scholarship. Information on Student Exchange program can be obtained from the Universitas Indonesia’s International Office, PAU Building 1st floor. Courses taken during the study exchange program are transferrable when they return to Universitas Indonesia. Thus, students are still able to graduate on time.

In addition, Undergraduate students can participate in Double Degree 2 +2 International Undergraduate program with FTUI’s partner universities. Students participating in this program will spend the last two years studying at the partner university abroad and he will earn two degrees once he graduates. However, this Double Degree program offers no scholarships. Thus, participating students should ensure their availability of funds. Student participating in classes outside of the university (in the form of Student Exchange, International Undergraduate Dual Degree Program, Sandwich Program, Joint Degree Program, or other university acknowledge program) for at least one semester will be given an “overseas” or study outside of the university status. Before leaving to continue their study overseas, students must ensure that their status in SIAK NG has been change to “overseas”, and they are obliged to make payment to Universitas Indonesia in the amount stated in the applied Rector’s Decree of “overseas” academic fee. Period of study abroad, either on the Student Exchange program and the Double Degree, is counted as part of the whole study period. The result or grades obtained from this program will not be calculated in determining their GPA and will be given a letter grade of TK in their transcript.

Fast Track

FT UI students, Regular, Parallel or International Undergraduate Program, with brilliant academic achievements can participate in the Fast Track program. In this program, FTUI’s undergraduate students in semesters 7 & 8 are allowed to take several Master program courses. Courses that can be taken and

other requirements are specified by the Study Program in a way that the students can directly pursue Master program in FTUI and complete the program in 1 year. Thus, the total time needed to complete both undergraduate and master programs is 5 years or 10 (ten) semesters.

The Academic load for the Fast Track Program curriculum is as follow:

- a. For the undergraduate program is 144 (one hundred and forty four) credits including 16-22 credits of elective subjects taken from the main competence subjects of the Master Program.
- b. For the Master Program is 40-44 credits including the 16-22 credits from subjects mentioned in point a above and are acknowledge through credit transfer.

If student is unable to complete his/her Undergraduate Program in 8 (eight) semesters, then the student will be deemed as unable to complete the Fast Track program, making all the subjects of the Master Program he/she has taken will be considered as an elective subjects in their completion of the Undergraduate Program and cannot be acknowledge as part of their credit towards continuing to the Master Program.

Requirements and Procedure for Fast Track Registration

Undergraduate students who are interested in participating in the Fast Track Program must fulfill the following requirements:

Having a minimum GPA of 3.50

Having a minimum Institutional TOEFL/EPT score of 500 (students may use the score from the EPT test they took as new student in FTUI)

Having a high motivation for research

Procedure for Fast Track Program:

Fast Track Program is open for all FTUI undergraduate study programs which have the same specialization with the Master programs (for undergraduate study programs that have specialization).

Students who are interested in participating in the Fast Track Program are required to fill out the Registration Form downloadable through the <http://www.eng.ui.ac.id/index.php/ft/downloadindeks> (titled: (FormulirPendaftaran Fast Track Magister FTUI).

Students registering for the BeasiswaUnggulan from the Ministry of Education and Culture selection are required to fill out the BeasiswaUnggulan registration form downloadable from the same web page.

The Fast Track Registration Forms will be evaluated by a team headed by the Head of Department.

If the student's application to participate in the Fast Track scheme is approved, they are required to counsel with his/her academic advisor for the finalization of his/her Undergraduate (S1) and Master (S2) Study Plan. The student's study plan for semester 7 and 8, especially for the undergraduate Elective Course selection must be in accordance with the Compulsory and Elective Courses in their respective Master study program in line with their specialization.

Undergraduate thesis and thesis of the student are expected to be of continuous research to maximize knowledge, experience and quality research result.

The funds for the Fast Track Program will be borne entirely by the student.

Registration Form for the Fast Track Program for each running Academic Year may be submitted to each Department Secretariat on March each year at the latest.

2.2. ADMINISTRATIVE AND ACADEMIC REGISTRATION

Academic Calendar

Administrative and academic schedules in FTUI are set in accordance with the administrative and academic schedules in Universitas Indonesia as follows:

Term 1 2016/2017 *)

Administrative registration in Universitas Indonesia
26 July - 25 August 2016

Academic registration in Universitas Indonesia
23 January 2017 - 3 February 2017

Course period
29 August 2016 - 23 December 2016

Mid-semester examination
17 - 21 October 2016

End of Semester Examination
13 - 23 December 2016

Deadline for grade assignment in SIAK-NG
5 January 2017

Departmental Judicium
1st, 1 November 2016
2nd, 11 January 2017

Faculty Yudicium
1st, 3 November 2016
2nd, 13 January 2017

Graduation
4 February 2017

Term 2 *)

Administrative registration in FTUI
23 January - 20 February 2017

Academic registration in FTUI
23 January 2017 - 3 February 2017

Course Period and examination
6 February 2017 - 26 May 2017

Mid-semester examination
27 - 31 March 2017 & 4 April 2017

End of Semester Examination
15 - 26 May 2017

Graduation
25 - 26 August 2017

Short Semester *)

Administrative Registration
2 - 9 June 2017

Academic Registration
19 May - 1 June 2017

Course period
12 June - 18 August 2017

Mid-semester Examination
17 - 21 July 2017

End of Semester Examination
14 - 18 August 2017

Note:

*) Schedules are subject to change

Note:

- Short Semester course period is held for 8 weeks, including mid-semester and final semester examinations.
- 2 credit courses consist of twice 2-hour contact per week, 3 credit courses consist of three times 2-hour contact per week, 4 credit subject consist of four times 2-hour contact per week.
- For regular undergraduate program: Faculty Basic Courses (Physics, Mathematics and Chemistry) are only available for students who wish to retake the course and have attended required lab activities.
- A student can take up to a maximum of 12 credits during the short semester.
- Courses offered are determined by the Department.

- If the number of students registered for a certain course in the Short Semester does not meet the minimum requirement, then the course will be canceled.
- Short Semester's tuition fee is not included in the normal tuition fee (BOP) and is calculated by the number of credits taken during the short term. Tuition fee for each credit is determined by FTUI.
- Payment for short semester courses must be made before the payment period is closed. Otherwise, the student's name will be automatically removed and the student is no longer considered as a participant in the short semester.

Registration and Course Guidelines

Before administrative registration takes place, FTUI publishes an academic calendar for one semester listing schedules for courses, mid-term, final-term examinations and other academic activities. The academic calendar and course schedule could be accessed at <http://www.eng.ui.ac.id>, and SIAK NG.

Administrative Registration

Administrative Registration includes payments of tuition fee and admission fee. Students are responsible for paying fees by the payment deadline. Students who do not complete the registration process by the payment deadline will not be registered at that particular semester will be included toward student's allowed length of study. Administrative registration are done by paying the tuition fee through the host-to-host system by the ATM (Automated Teller Machine) or bank teller of banks in cooperation with the Universitas Indonesia.

Academic Registration

Students should do online academic registration; consult with his/her Academic Advisor for approval and signing the Course Plan Form or FormulirRencanaStudi (FRS) during the academic registration period. The main duties of Academic Advisor are:

- Helping and directing students in their study plan particularly in selecting courses and in solving their academic problems
- Monitoring and evaluating student's academic performance during their period of study.

Students should logon to <https://academic.ui.ac.id> using username and password provided by the Office of PengembanganPelayananSistemInformasi (PPSI) UI. Students could get their username and password at PPMT (PusatPelayananMahasiswaTerpadu) building. Students could also download course schedules and academic calendar from the website.

After completing the online FRS, students should print the form (3 copies) and meet their PA to discuss, verify and validate the courses taken. Students have to check their FRS after registration period to ensure that the courses taken are correct. Fines will be levied to students for late administrative and academic registration, as per the university or the faculty regulation.

Sanctions

1. Students who do not carry out the administrative registration will receive inactive status as a student in the current semester, which is included as their length of study.
2. Students who do not carry out academic registration cannot follow the academic activities in the current semester, which is included as their length of study.
3. Students who are not active as referred to in points (1) are not charged with tuition payments.
4. Students who do not carry out the registration and administration of academic registration 2 (two) consecutive semesters, expressed as a university student resigned without notice from the university.
5. Active students who do not complete the payment in accordance with the agreement until the end of the semester goes imposed the fine of 50% of the unpaid amount.
6. Payment of fines referred to in points (5) shall be paid at the following semester Academic Registration

Exception Administrative Registration

When non-active students, with all reason intend to maintain their status as active students, they have to follow the procedure of administrative registration:

- Obtain the approval from FTUI by filling out a form available at PAF (Pusat Administrasi Fakultas/ Faculty Administrative Center).
- The students must come to the Directorate of Finance UI to obtain the approval for paying the tuition fee after paying the penalty 50% from the tuition fee on the current semester.
- The approval will be used by the students for paying the tuition fee manually.
- Students must give the copy of the payment record to the Directorate of Finance UI for verification.

Prerequisite Courses

These courses can only be taken if a student is currently taking or has previously taken and passed the prerequisite course with sufficient grade [not T].

Requirements for Transfer to Partner Universities in Australia for Double Degree Program

Minimum requirement of GPA and English before transferring to Partner University is listed in Table 2.3. Eligible students can continue their study to partner universities in Australia if they fulfill the following requirements:

1. Achieve minimum GPA as required at the end fourth semester for the 2+2 program;
2. Passed all required subjects as listed in the Study Program curriculum with minimum C with a total of passed credits consistent with the total number of credits listed in the Study Program curriculum for semester 1-4.
3. Achieve minimum IELTS or TOEFL scores as required.
4. If GPA less than required, the students must stay at UI and repeat some subjects to improve their GPA, while administratively and academically registered at FTUI.
5. If GPA meets minimum requirement, but IELTS or TOEFL scores less than minimum requirement, they are suggested to improve their IELTS or TOEFL score in Indonesia and maintain administrative registration at FTUI. Other choice is to take English for Academic Purposes (EAP) at the partner university. Information on duration and schedule of EAP can be found at the partner university's website.

Table 2.3. Minimum requirement of GPA and IELTS or TOEFL for transfer to the Partner Universities

Partner University	Minimum GPA	Minimum IELTS / TOEFL
QUT	3.0	IELTS min. 6.5 with no band lower than 6 ibT min 90 with no band lower than 22
Curtin		
UQ		
Uni Sydney		
Monash	3.2	

English Language Requirements for Undergraduate International Program Single Degree

Students of the Undergraduate International Program Single Degree (class of 2012 and after) are obligated to obtain an English certificate in IELTS (International English Language Testing System) or TOEFL iBT (Test of English as a Foreign Language -internet Based Test) with the following minimum score:

Type of Test	Overall Minimum Score	Additional Requirements
IELTS	6.5	No bands lower than 6.0
TOEFL iBT	80	No bands lower than 20

This English Language Certificate is one of the requirements before they may proceed to have their Undergraduate Thesis/ Final Project Exam. The date of said English Language Certificate is taken at least during their third semester of study.

Procedure for Study Abroad/ Student Exchange to Partner University for Undergraduate International Program Single Degree

1. Student choose a Partner University <ul style="list-style-type: none"> • Find out list of UI's Partner Universities • Information on Study Abroad/ Student Exchange Information from International Office UI through http://international.ui.ac.id
2. Student contacted the selected partner University for Information on: <ul style="list-style-type: none"> • List of subjects offered and course description • List of requirements/documents needed. • Application and Tuition Fees. • Other Documents needed.
3. Student consulted their Academic Guidance Counselor or the Vice Head of Department to determine the subjects they will take in Partner University that can be credit transferred upon their return.
4. The Head of Department issued a Letter addressed to the Vice Dean stating: <ul style="list-style-type: none"> • Name and Student ID of student participating in the Study Abroad/Student Exchange Program • Name of Partner University and length of study of said program • List of subjects that the students will take at Partner University.
5. The Vice Dean will assigned the Associate Dean for Academic and Head of PAF to process the student's status to "overseas" or "student exchange and issued a Reference Letter and Academic Transcript for the student.
6. Student prepare the documents needed for their Study Abroad/ Student Exchange: <ul style="list-style-type: none"> • Application Form • IELTS/TOEFL iBT • Other language requirement • Reference Letter and Academic Transcript from the Faculty.
7. Student sends their application documents to Partnery University.
8. Student receives Letter of Offer dan Letter of Acceptance from Partner University.
9. Student makes payment and signed the Letter of Offer
10. Student applies for Student Visa to the Country where the Partner University is located.
11. Departure to Partner University

2.3. GRADUATE PREDICATE

Students are considered to have passed the undergraduate program and earned a Bachelor Degree (S.T or S.Ars) if they are: registered as an active student in Universitas Indonesia during said semester both administratively and academically; have passed all the mandatory courses and acquired a minimum of 144 credits in accordance with the applicable curriculum with "C" as the lowest grade and completed all 8 semesters scheduled academic load within 8-12 semesters; completed all administrative obligation including the return of all borrowed library and laboratory collection; and complete all obligation of their study period and/or all assignments given in accordance to the curriculum of the Study Program (including revised Final Project) with a GPA $\geq 2,00$ (two point zero). Honor predicate for graduates are determined by the student's final GPA as follow: Cum Laude (3,51 - 4,00), Very Satisfactory (3,01 - 3,51), and Satisfactory (2,76 - 3,00). For an undergraduate student to earn the Cum Laude degree, he must finished his study within 8 (eight) semesters time without retaking any courses.

Students are considered to have passed the Master program and earned a Master of Engineering or Master of Architecture Degree if they have passed all the required 40 - 42 credits, a ≥ 3.00 GPA

with “C” as the lowest grade and do not exceed study period and have met all administrative requirements. Honor predicate for graduates are determined by the student’s final GPA as follow: Cum Laude (3.71 - 4.00), Very Satisfactory (3.41 - 3.70), and Satisfactory (3.00 - 3.40). For a Master program student to earn the Cum Laude degree, his length of study must not exceed 4 (four) semesters time without retaking any courses.

Students are considered to have passed the Doctoral program and earned a Doctor Degree if they have passed all the required 48 - 50 credits, a minimum GPA of 3.00 with a minimum “C” for in-class courses and a minimum “B” for research courses, do not exceed study period and have met all administrative requirements. Honor predicate for graduates are determined by the student’s final GPA as follow: Cum Laude (3.71 - 4.00), Very Satisfactory (3.41 - 3.70), and Satisfactory (3.00 - 3.40). For a Doctoral program student to earn the Cum Laude degree, his length of study must not exceed 6 (six) semesters time without retaking any courses. The mark “BS” is not counted as course repetition. If a student’s final GPA is within the 3.71 - 4.00 range but he fail to meet the other requirements, he will be awarded the “Very Satisfactory” predicate.

2.4. ACADEMIC PERFORMANCE EVALUATION AND DROPOUT CRITERIA

Undergraduate Program

The university also requires that students maintain satisfactory academic performance during their study at FTUI and meet the following evaluation criteria to be able to continue their studies:

- Attain at least 24 credits with a minimum of C at the end of their second semester;
- Attain at least 48 credits with a minimum of C at the end of their fourth semester;
- Attain at least 72 credits with a minimum of C at the end of their sixth semester;
- Attain at least 96 credits with a minimum of C at the end of their eighth semester;
- Attain all required credit with a minimum of C at the end of their twelfth semester;

Or:

- Have the following problem: have an inactive status (empty) for two semesters in a row thus being declared as “resign” automatically from the status of Universitas Indonesia’s student by the Rector’s decree on Status Determination.
- Proven to be in violation of rules or regulations that caused the student to lose his right as FTUI students.
- Deemed unfit to continue their study based on consideration from a team of Doctors appointed by the Head of the University.

Student who still maintain satisfactory academic performance and meet the evaluation criteria to continue his study but would like to resign on his own free will may submit a written application to the Dean with a copy to the Head of the Department.

Master Program

The Maximum length of study to earn a Master Degree in FTUI is at the latest 6 (six) semesters, starting from registration time to graduation. This provision also applies to students who enroll in the FTUI Master program with a “probation” status. Students will lose their right to continue the study (dropping out) if:

- Students fail to achieve a 3.00 GPA of at least 14-18 passed credits (for regular Master Program student) or 12-14 passed credits (for non-regular Master Program student) at the end of the second semesters;
- In the end of the study period evaluation, students fail to achieve the following graduation requirements: registered as an active student in Universitas Indonesia during said semester both administratively and academically; not exceeding the maximum length of study; completed all administrative obligation including the return of all borrowed library and laboratory

collection; and complete all obligation of their study period and/or all assignments given in accordance to the curriculum of the Study Program (including revised Final Project) with a GPA $\geq 3,00$ (three point zero)

- Students who do not register academically and administratively for two consecutive semesters.
- Proven to be in violation of rules or regulations that caused the student to lose his right as FTUI students.
- Deemed unfit to continue their study based on consideration from a team of Doctors appointed by the Head of the University.

Student who still maintain satisfactory academic performance and meet the evaluation criteria to continue his study but would like to resign on his own free will may submit a written application to the Dean with a copy to the Head of the Department.

Doctoral Program

The Maximum length of study earn a Doctoral degree in FTUI is 10 (ten) semesters, starting from registration time to graduation.

Students of the Doctoral Program (Class and Research) will lose their right to continue to study (dropping out) if:

- Students who do not register academically and administratively for two consecutive semesters will be automatically considered to have resigned from UI.
- Failed to obtain a minimum of B for their Research Proposal Examination or similar exam at the end of their fourth semester;
- Failed to obtain a minimum of 50 (fifty) percent for their Research based on the judgment of the promoter team at the end of their sixth semester;
- Failed to obtain a minimum of 75 (seventy five) percent for their Research based on the judgment of the promoter team at the end of their eight semester;
- Failed to obtain the following by the end of their study period of ten semesters: produce 1 (one) scientific paper based on research for their dissertation as main writer that can be accompanied by the promoter team and has been accepted to be published in an indexed international journal (8 credits); submit proof of compliance of requirements as stated before as part of the requirements for promotion exam; submit 1 (one) Dissertation and participate in a Promotion Exam as the final step of the Doctoral Program (6-8 credits).
- Exceeded the maximum length of study (10 semesters).
- Proven to be in violation of rules or regulations that caused the student to lose his right as FTUI students.

Student who still maintain satisfactory academic performance and meet the evaluation criteria to continue his study but would like to resign on his own may submit a written application to the Dean with a copy to the Head of the Department.

Students of the Doctoral Program (Research) will lose their right to continue to study (dropping out) if:

- Students who do not register academically and administratively for two consecutive semesters will be automatically considered to have resigned from UI;
- Failed to obtain a minimum of B for their Research Proposal Examination or similar exam at the end of their fourth semester;
- Failed to obtain a minimum of 50 (fifty) percent for their Research based on the judgment of the promoter team at the end of their sixth semester;
- Failed to obtain a minimum of 75 (seventy five) percent for their Research based on the judgment of the promoter team at the end of their eight semester;
- Failed to obtain the following by the end of their study period of ten semesters: produce 1 (one)

scientific paper based on research for their dissertation as main writer and be presented at an international scientific conference and published in the proceeding as a full paper (6 credits); produce 1 (one) scientific paper based on research for their dissertation as main writer that can be accompanied by the promoter team and has been accepted to be published in an indexed international journal (8 credits); submit 1 (one) scientific paper that has been accepted to be published in a nationally accredited journal; submit proof of compliance of requirements as stated before as part of the requirements for promotion exam; submit 1 (one) Dissertation and participate in a Promotion Exam as the final step of the Doctoral Program (6-8 credits).

- Exceeded the maximum length of study (10 semesters).
- Proven to be in violation of rules or regulations that caused the student to lose his right as FTUI students.

Student who still maintain satisfactory academic performance and meet the evaluation criteria to continue his study but would like to resign on his own may submit a written application to the Dean with a copy to the Head of the Department.

2.5. ACADEMIC LEAVE

Student who wishes to be away from his/her academic endeavors at FTUI for one to two semesters, but intend to return to FTUI are eligible for academic leave of absence. Leave of absence could be only given to student who has studied at least two semesters at FTUI, unless with specific circumstances. Academic leave for special circumstances are academic leave that is given to students for an unavoidable hindrance, such as: state task, university task, or undergoing medication which prohibited said student to participate in academic activity. Academic leave is not counted as part of the length of study.

Procedures of Academic Leave

1. To obtain academic leave, a student must write a letter requesting for academic leave to the Dean before the beginning of the administrative registration period of semester.
2. If the academic leave is approved, PAF will change the status of the student as academic leave before the beginning of the administrative registration period of semester and the amount of tuition fee will automatically be changed.
3. The student must pay 25 % of tuition fee during the period of administrative registration of the intended semester.
4. If a student has been granted an academic leave but fail to pay the obligated fee due to them during the registration period, the academic leave will be canceled and the student status will revert to inactive (empty).
5. In the situation as stated above, if the student still insist on making payment after the registration period has passed, the student will be charged with a late administration registration fee in the amount stated in the regulation issued in the Rector's Academic Fee.
6. If the students fail to pay during the prescribed period of administrative registration, Exceptional Administrative Registration will apply.
7. If the Academic Leave is proposed not accordance with point (1) above, or is proposed after the semester is on, the student should pay full amount (100 %) of tuition fee.

2.6. FACULTY and DEPARTMENT JUDISIUMS

Judisium is a meeting held at both the Faculty and the Department level to decide whether a student has fulfill all academic requirements and may graduate and earn a degree in engineering based on the Department / Faculty Evaluation.

2.7. SEMESTER GRADE TRANSCRIPT, DIPLOMA and ACADEMIC TRANSCRIPTS

FTUI Central Administration Office is responsible for issuing Semester Grade Transcript, Diploma

and Academic Transcript for all FTUI's graduates. Student Academic History is issued based on student's request while the diploma and academic transcripts are issued only once at the time of the student's graduation. Contained within the Student Academic History and Academic Transcript are name, course code and grades of all courses that the students took during their study period. Also included is the student's Grade Point Average (GPA) which is calculated based on all courses' grades. Diplomas and Academic Transcripts will be handed to all graduates no later than 2 (two) months from the date of graduation.

The Semester Academic Transcript (DNS) gives the information on the student's identity (name, student ID and latest education), Academic Advisor, Faculty, Study Program, Specialty, Education Level, Subject Code, Subject Title, Credit, Letter Grade, Semester GPA, and GPA. The Semester Academic Transcript can be issued as hard copy based on a student request as required. A valid DNS is signed by official handling the academic administration in the Faculty level.

Academic Record recorded chronologically all academic activity of a student since they first registered as a student until they are no longer registered, due to graduation, drop out, or resignation. The academic status of each semester is recorded in the Academic Record. The Academic Record is also used as a source of information for student, Academic Advisor, and Study Program to the success of a student study and is issued as required based on the student's request and validated by the Vice Dean of the Faculty.

Academic Transcript is given to student that has been declared as a graduate from a Study Program which is decided in a graduation determination meeting and contained information on a student identity (name, student ID, place and date of birth), previous education, education level, study program, specialty, list and code number of subjects, letter grade, number of required credits, number of obtained credits, GPA, title of the student's Final Project, diploma number and year of graduation. All subjects taken by the student, including repeated subjects and transfer credit subjects, are included in the Academic Transcript which is issued in two language, Bahasa Indonesia and English. The Academic Transcript will be given to students with no arrears of tuition fees.

Diploma is given to student that has been declared as a graduate from a Study Program which is decided in a graduation determination meeting. Diploma contained information on the identity of the diploma holder (name, place and date of birth), academic title, name and signature of the Rector and Dean, date of diploma issued, date of graduation, student ID, diploma number and signature and photo of the diploma holder. In the event that the diploma is lost or damaged, the diploma holder is allowed to request a copy of the diploma. Dean/ Vice Dean/ Director of Academic on behalf of the Rector may signed to validate a copy of diploma. Diploma will be given to students with no arrears of tuition fees.

2.8 OFFENSES AND SANCTIONS

In any particular courses, no students shall engage in any form of unethical or improper conduct, such as but not limited to examination offenses:

Utilizing unauthorized materials/notes to enhance performance during on examination.

Attempting to observe the work of another student.

Taking an examination for another person, or permitting someone else to do so.

Collaborating improperly by joint effort on discussion in anyway expressly prohibited by lecturer.

When incidents, as enumerated above occurs, the following sanctions may be imposed (as per FTUI regulation):

The student may be assigned E for the subject in question

The student may be suspended for one semester

The student may be dismissed or expelled by FTUI

If necessary, a meeting of PanitiaPenyelesaianPelanggaran Tata Tertib (Offence Settlement Committee) (PT32) may be held.

Academic Sanction for Perpetrators of Academic Cheating In Exams

- a. Academic sanction in the form of the cancellation of said exam (E grade) for student caught or proven committing academic fraud in examination process, such as working with other student, copying other student's work or giving answer to other student;
- b. Academic sanction in the form of study period cancellation (for all subjects) for said semester

- for student caught or proven committing academic fraud in examination process such as opening books, notes or other equipment planned before;
- c. Academic sanction in the form of cancellation study period for said semester and one semester suspension for student caught or proven committing academic fraud in examination process due to working together with outside person(s) outside of the examination room;
 - d. Academic sanction in the form of expulsion from the Faculty of Engineering Universitas Indonesia (expelled) for student caught or proven committing academic fraud in the examination process by replacing other examinee or by having someone else take their place;
 - e. Academic sanction in the form of expulsion from the Faculty of Engineering Universitas Indonesia (expelled) for student caught or proven committing academic fraud in the examination process for planning and carrying out the plan to help other examinee;
 - f. Other academic fraud will be handled through a hearing by the Committee of Rules and Conduct Regulation Violation (Panitia Penyelesaian Pelanggaran Tata Tertib (P3T2)) Faculty of Engineering Universitas Indonesia;
 - g. Student is entitled to an appeal with the help of their Academic Advisor and the Vice Dean for Academic, Research, and Student Affairs Faculty of Engineering Universitas Indonesia, submitted to the Faculty Academic Senate in the quest of justice.

Academic Sanction on Plagiarism and Act of Fraud in the Completion of Final Project

Plagiarism is an act of stealing ideas or thought already available in written and/or someone else's writing and used them as if it is our own ideas, thoughts and/or writing thus causing harm/loss to the original owner both material or non material, this plagiarism can be in the form of using a word, phrase, sentence, paragraph, or even a chapter of someone else's writing or book, without stating the source. Included in this is the auto plagiarism.

Auto Plagiarisme is an act of using an idea or thought repeatedly in writing or using someone's own writing in parts or whole without stating the origin published source as if those ideas or thoughts are a new idea, thought and/or writing.

Plagiarism criteria used as a based to decide a sanction focuses on the amount of idea or phrase stolen and how similar the writing in phrase, sentence, paragraph, section, chapter, and the writing as a whole. A work can be considered plagiarism if based on the verification result on the writing contained a similarity level of 35% or more with the original work. To prevent plagiarism, student is obligated to check their final work using software of anti plagiarism provided by the Faculty or University before submitting their work to their advisor/promoter/co-promoter. If such software is unavailable, student is required to check existing list of research in connection to the topic of their research and state such research in their reference of research. Student caught and proven of committing plagiarism is entitled to an appeal tried in the Study Program level to the Faculty which the Faculty will later passed on to the university through the P3T2 to be verified and processed.

In case of an active student, early sanction can be in the form of delaying the final project examination or delaying the graduation status for student who has been declared passing the final project examination. Student that has been declared as a graduate but have not received their diploma, with the approval of the Rector, the Dean may hold said student diploma while await the Rector's final decision. Academic sanction on plagiarism for active student is established through the Dean's decree based on the proposal by the Head of the Study Program or recommendation from the Faculty in one month at the latest since the date of the proposal letter was accepted by the Dean. For graduate student is established through the Rector's Decree based on the P3T2 recommendation. The heaviest academic sanction given can be in the form of cancellation of the student final project (for active student) with the obligation to write a new final project with new topic, while for graduate student the sanction is in the form of revocation of academic titles.

The act of fraud in the writing of Final Project, Essay as Exam Substitute, or Assignment, includes the usage of other person's service/ replacement/ consultant/ or other service to complete assignments in the name of said student and other manipulative act of fraud. This act does not include the usage of service for data collecting, survey, and data processing for the completion of final project of student. Sanction given to the perpetrator of said act of fraud in the completion of final project is established through the Dean's decree issued in one month at the latest since the proposal letter from the Head of Study Program is received by the Dean. The heaviest academic sanction given can be in the form of cancellation of the student final project (for active student) with the obligation to write a new final project with new topic, while for graduate student the sanction is in the form of revocation of academic titles. Active students who consciously act as a ghost writer in writing the final works for other students will be given the equivalent of student academic sanction given to the perpetrators of acts of fraud.

2.9. ACADEMIC REGULATION OF THE UNIVERSITAS INDONESIA

List of Academic Regulations at Universitas Indonesia can be accessed via <http://resipatory.ui.ac.id>.

Below is a list of Decrees that functioned as reference for education program at Universitas Indonesia

GENERAL:

Decree of the Board of Trustees Universitas Indonesia

Number: 008/SK/MWA-UI/2004 on the Amendment of Board of Trustees' Decree Number: 005/SK/MWA-UI/2004 on the Code of conduct on Campus Life in Universitas Indonesia

EDUCATION:

Decree of the Rector Universitas Indonesia

Number: 285/SK/R/UI/2003 on the Implementation Guidelines for Cross-Faculty Lectures in Universitas Indonesia

Decree of the Board of Trustees Universitas Indonesia

Number: 006 / MWA-UI/2004 on the Universitas Indonesia's Academic Curriculum

Decree of the Rector of Universitas Indonesia

Number: 491/SK/R/UI/2004 on Universitas Indonesia Education Activities Conclusion Regulations

Decree of the Board of Trustees Universitas Indonesia

Number: 001 / TAP/MWA-UI/2005 on the Establishment of Academic Degrees in the Universitas Indonesia.

Decree of the Board of Trustees Universitas Indonesia

Number 003 / TAP/MWA-UI/2005 on General Guidelines for Implementation on Universitas Indonesia's Professional Programs

Regulation of the Board of Trustees Universitas Indonesia

Number: 006 / Peraturan/MWA-UI/2005 on Student Learning Outcomes Evaluation at Universitas Indonesia

Regulation of the Board of Trustees Universitas Indonesia

Number: 007 / Peraturan/MWA-UI/2005 on Academic Education Implementation Norms in Universitas Indonesia

Number: 008 / Peraturan/MWA-UI/2005 on Professional Education Curriculum Norms in Universitas Indonesia

Decree of the Rector of Universitas Indonesia
Number: 838/SK/R/UI/2006 on Administration of Universitas Indonesia Student's Learning Outcomes

Decree of the Rector of Universitas Indonesia
Number: 012/SK/R/UI/2007 on Implementation of the of Students Learning Activity in Universitas Indonesia

Decree of the Rector of Universitas Indonesia
Number: 450/SK/R/UI/2008 on the Implementation of E-Learning in the University Indonesia

Decree of the Dean of Faculty of Engineering Universitas Indonesia
Number: 290/D/SK/FTUI/VI/2013 on the English Requirements for Undergraduate International Program Single Degree Faculty of Engineering Universitas Indonesia.

Decree of the Rector of Universitas Indonesia
Number :014 year 2016 on the Implementation of Undergraduate Program in Universitas Indonesia

Decree of the Rector of Universitas Indonesia
Number :015 year 2016 on the Implementation of Master Program in Universitas Indonesia

Decree of the Rector of Universitas Indonesia
Number :016 year 2016 on the Implementation of Doctoral Program in Universitas Indonesia

Decree of the Dean of Faculty of Engineering Universitas Indonesia
Number: 622/D/SK/FTUI/IX/2016 on Academic Sanction for Academic Fraud Perpetrator in Faculty of Engineering Universitas Indonesia.

Decree of the Dean of Faculty of Engineering Universitas Indonesia
Number: 623/D/SK/FTUI/IX/2016 on General Regulation on Supplementary Exam for Mid Term and Final Examination in Faculty of Engineering Universitas Indonesia.

Decree of the Dean of Faculty of Engineering Universitas Indonesia
Number: 624/D/SK/FTUI/IX/2016 on Academic Sanction for Plagiarism and Act of Fraud in the Completion of Final Project in Faculty of Engineering Universitas Indonesia.

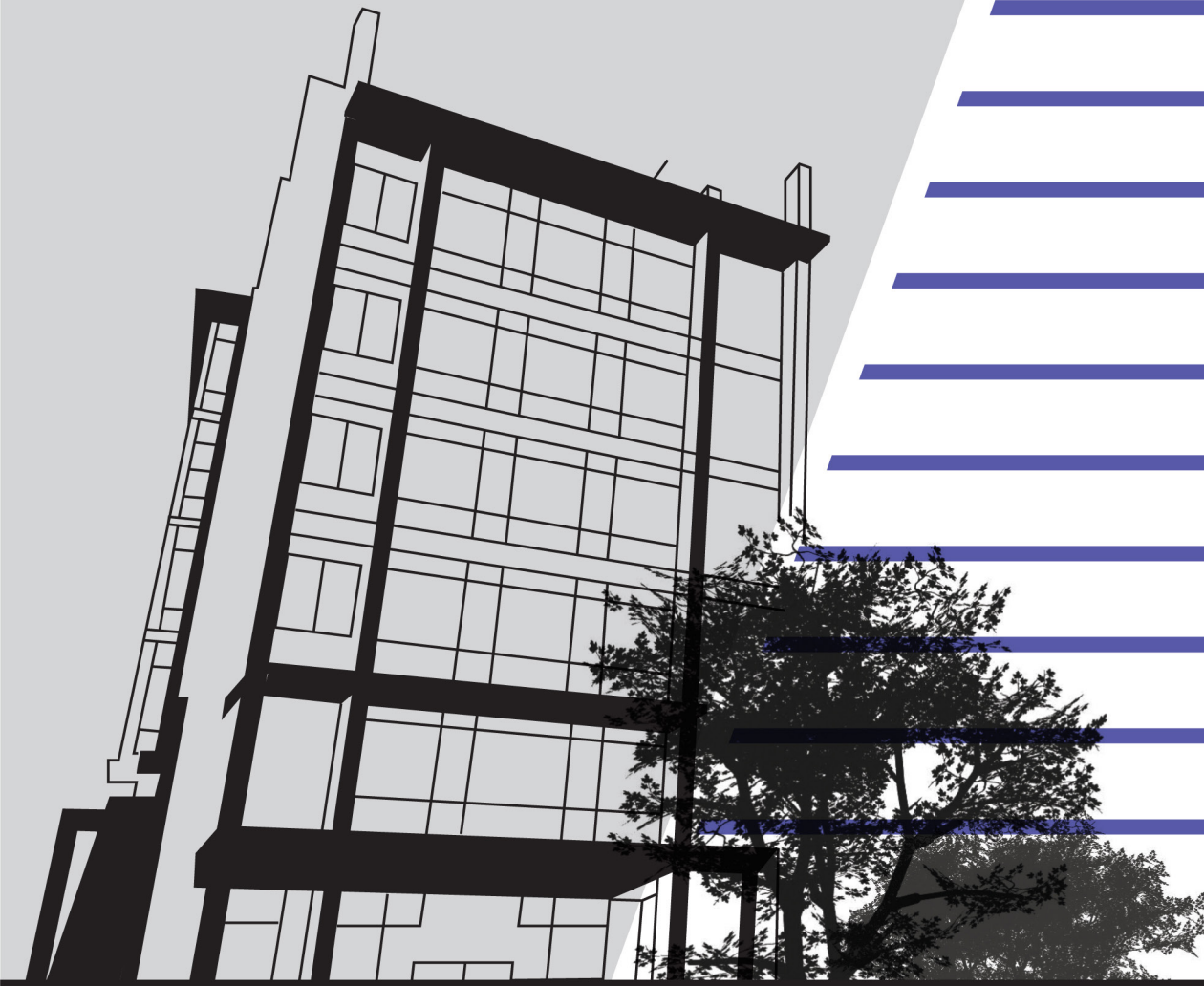
RESEARCH

Decree of the Board of Trustees Universitas Indonesia
Number 002/SK/MWA-UI/2008 on University's Research Norms

Decree of the Board of Trustees Universitas Indonesia
Number 003/SK/MWA-UI/2008 on Research Policy at Universitas Indonesia

Decree of the Board of Trustees Universitas Indonesia
Number 009/SK/MWA-UI/2008 on amendment of the Decree of the Board of Trustees of Universitas Indonesia Number 003/MWA-UI/2008 on Research Policy in Universitas Indonesia

FACILITIES
AND CAMPUS LIFE



3. FACILITIES AND CAMPUS LIFE

NEW FACILITIES AVAILABLE IN FTUI

1. All classrooms in S building are now having one special chair for each classroom dedicated to left handed students.
2. FTUI has renovated the S405 classroom into a specially design discussion room for students to learn and discuss in groups in the implementation of Student-Centered Learning (SCL). This renovation is partly funded by USAID through their PEER Science research program by providing chairs, computer screen for each discussion group, wireless LCD projector and documented camera. The renovation is completed by the start of the Odd Semester of 2015. The class room will be able to accommodate up to 80 students in groups discussion form as in problem-based learning (PBL) or Collaborative Learning (CL) and up to 100 students in class room form
3. Online Electricity Metering and Monitoring System now help FTUI in monitoring electricity usage of each building and their characteristic. www.ee.ui.ac.id/power; www.eng.ui.ac.id/power
4. Offline Water Metering and Monitoring System prepare FTUI in determining the water usage of each building and help plan the creation of rain water well within the faculty.
5. Smoking is prohibited throughout most of the faculty areas. However, the new and vastly improved Smoking Shelter is now available in the student’s cafeteria area and in front of the S Building.
6. Starting from April 2012, we have started to tests all of our cafeteria vendors for E-Coli. Working together with the Faculty of Public Health, we conducted several Hygiene tests to our vendors. Between these tests we also conducted seminars, socialization, and counseling to all of our food vendors regarding the level of cleanliness and hygiene level expected from them. We also improved the sewer, sink and the vendor’s facilities to achieve the desired effect. By February 2015, all food vendors in our Student’s Cafeteria are 100% free of E-Coli, Salmonella and Borax. Thus, making us proud to say that FTUI’s Students’ Cafeteria is one of the healthiest in the university.

3.1. INTEGRATED STUDENTS SERVICE BUILDING (PPMT)

This building is located at the left of the Rector building with the one door policy in serving the registration process of all Universitas Indonesia students, whether they are vocational, undergraduate, undergraduate extension, master, doctoral, specialist, and professional students. This building consists of three divisions: PPSI division, Student Affairs division, and Academic division.

3.2. FACULTY ADMINISTRATION CENTER (PAF)

Academic administrative services for all academic programs in FTUI are managed by PAF. The services provided for students include academic records, change of grades from lecturers, testamur and academic transcripts, registration, absence of leave, enrollments and letter of reference letter. The working hour is at 08.00 to 16.00 from Monday to Friday, at PAF building.

3.3. UNIVERSITY CENTRAL LIBRARY

Location : Kampus UI Depok

Service hours of UI Central Library

Monday - Friday	08.30 - 19.00 WIB
Saturday & Sunday	08.30 - 15.00 WIB
Holly Month of Ramadhan	08.30 - 15.00 WIB

Membership:

Students, lecturers, researchers and employee of the Universitas Indonesia are entitled for membership of the central library with the following requirements:

1. Provide the latest semester payment proof or the latest study card (IRS) or certification letter from any faculty, unit or department within the Universitas Indonesia.
2. Provide a 2x3 photo (one)
3. Provide a cover letter from the faculty (for lecturers)

Lending Procedures:

- General text books can be borrowed for two weeks (max. 3 books) by showing your Student Card. Borrowed books need to be stamped.
- Reference books, magazines, newspaper and thesis can only be read on the spot or photocopied.
- Dissertation and thesis can only be photocopied as many as 10 pages.

UI Central Library Services

Reference Service

This service is provided to help the UI civitas academica in searching information, especially for students who are working on their final assignment or research. Information search request may be submitted in person or via email (reflib@ui.ac.id).

Information Package

Information package is a form of service in the form of certain topics of information packages. Each package consists of several articles and their annotation in accordance to the selected topic. Each article can be obtained by contacting the reference division first (reflib@ui.ac.id) or by direct phone request (+6221-7270751).

Information Search Training

The information search training consists of several packages. They are: basic and advance package. This training is provided to help improve the information skill of library visitors and members. This service is available to all university members, especially new students and students who are in their final year. Request for training can be submitted directly or through the email perpusui@ui.ac.id

Circulation (Borrowing Books)

The circulation services are located in level 1

The library's collection of reference books, thesis, dissertation, research reports and UI-ana can only be read on the spot at the UI Central Library.

UI Central Library Facilities

OPAC (Online Public Access Catalog)

OPAC is a tool to search the information regarding the available collection of the library by using a terminal computer. OPAC computers are available on every floor of the library.

Internet Access

Internet access connection at the UI central library uses the integrated network (JUITA - Jaringan Terpadu) and can also be accessed by using the UI Hotspot. Internet service is also available at the first floor of the central library. Also available are computers with internet access for the usage of library visitors and members.

Computer, Scanner and Data Backup

Students are allowed to use the provided computers to work on their assignments, picture/photo scanning and to burn the result of their information search to a CD.

Photocopy

A photocopy machine is available at the UI Central Library

Discussion, Class and Seminar Rooms

Discussion, Class and Seminar rooms are available for students' needs and for classes.

Special Study Rooms

Special study rooms are available and can be used by all university members. These rooms are equipped with a desk, filing cabinet and internet access.

Locker

250 lockers are available for UI Central Library Members.

3.4. COMPUTER SCIENCES & NETWORK

Directorate of Information System Development and Service (PPSI) are responsible for the programmed computer network system designed to help fulfill the students and lecturers needs in computer usage (from academic activities such as programming to internet usage) through the Integrated UI network (JUITA).

Requirements for using the JUITA:

- Registered as a UI student
- Fill out registration form with a reference from the Associate Dean for Students Affairs/ Head of Study Program/Academic Counselor of the student.

Place of Registration:

- Depok (Integrated Student Service Center Building)
- Salemba (PUSILKOM Building)

Hotline Service

Users who are experiencing problems in the use of this facility can report or request the help of the Computer Technical Unit through the following PPSI hotline service:

Phone : +6221-7863419
 Email : support@ui.ac.id
 Web Site : http/cso.ui.ac.id
 Office Hours : Monday - Friday
 (09.00 - 16.00)

Puskom Services at FTUI

Puskom (Pusat Komputer) provides services related to education and information technology development for students and academic/non-academic staff. The office is located at 2nd floor of GK Building at FTUI, Depok Campus. Main duties of Puskom is to provide education facilities for students, learning and research facilities for lecturers, and services for education administration, students and personnel. Puskom also provides connection services to internet and local area network at the Faculty and the University. Internet can be accessed at all area of FTUI. This facility can be used by students as well as faculties. All computer networks have been connected by fiber optic cables for inter-building and copper cable in the buildings with capacity of 100 Mbps. Besides providing local networks, Puskom also controls 7 computer servers with redundancy backup to minimize troubles in academic and research services. Computers are also available for students at various locations at FTUI i.e. computer laboratory at 2nd floor of GK Building, as well as at FTUI building at Salemba Campus. The service hour is 09.00 to 16.00 from Monday to Friday. For further information please contact Puskom at GK Building, 2nd floor, tel. 021-7863508, 021-2720011 ext. 64, or send email to puskom@eng.ui.ac.id.

3.5. STUDENT WELFARE**3.5.1. UNIVERSITAS INDONESIA MOSQUES**

- The Ukhuwah Islamiyah (UI) Mosque Depok located in the UI Depok Campus. Established on

28 January 1987 for the Friday prayer with Prof. H. Moh. Daud Ali, SH as khatib (preacher). This mosque was named Ukhuwah Islamiyah for within this mosque is fostered the Islamic brotherhood within the campus as well as the unity and brotherhood of Moslem from within and outside of campus area.

- The Arif Rahman Hakim (ARH) Mosque Salemba is located in the UI Salemba Campus. Established on 10 November 1967, 27 Rajab 1387 H. Based on the UI Rector Decree dated 16 August 1966, a development committee was established and consist of students. The vision of this mosque is to be the center of Islam education in the campus and produces modern Moslems (equipped with faith and knowledge) that can implement the teachings of Islam and help solve religious problems.

3.5.2. TEKSAS BRIDGE

The Teksas Bridge is a linkage bridge between two faculties in the UI Depok campus, the Faculty of Engineering and the Faculty of Humanities. These two faculties are separated by an 80 meters lake. The Teksas Bridge is hoped to serve as:

- As a connection bridge and “Landmark”
- As a research object for steel application product
- As a promotional tool on “Aesthetics Steel”

The concept of this bridge aims towards two approach:

- The side of the bridge on the Faculty of Engineering UI reflects a powerful and masculine character symbolized with a “Sail” shaped Pylon Bridge soaring to the sky as a symbol of “LINGGA”.
- The side of the bridge on the Faculty of Humanities UI reflects a flexible and feminine character symbolized with a “Hole Gate” shaped Pylon Bridge as a symbol of “YONI”.

3.5.3. CAMPUS BUS

To serve the transportation needs of students within the campus, Universitas Indonesia provides 20 campus busses. These busses will serve inside campus routes from these times: 07.00-21.00 (Monday-Friday) and 07.00-14.00 (Saturday). These yellow campus busses have two different routes:

- Blue: UI Dormitory, Gerbatama, UI Train Station, Faculty of Psychology, Faculty of Social and Political Science, Faculty of Humanities, Faculty of Economics, Faculty of Engineering, KuKel, Student Center Building, Faculty of Mathematic and Natural Sciences, Faculty of Public Health, Balairung, UI Mosque, and Faculty of Law.
- Red : UI Dormitory, Gerbatama, UI Trains Station, Faculty of Law, UI Mosque, Balairung, Faculty of Public Health, Faculty of Mathematic and Natural Sciences, Student Center Building, KuKel, Faculty of Engineering, Faculty of Economics, Faculty of Humanities, Faculty of Social and Political Science, and Faculty of Psychology.

Executive Bus

In order to provide transportation service, especially outside campus transportation, Universitas Indonesia provides Air Conditioned and Non-Air Conditioned busses for rent. These busses are available for various types of activity, such as: UI student organization activities, academic support activities, and many more.

Rental Procedures:

- Written rental request is submitted to:
Directorate of Student Affairs
Integrated Student Service Center
Building, Kampus UI Depok
Phone : +6221-7867222 (Operator)
Fax : +6221-7863453
- Payment should be made, at the very latest, one week before the date of use via BNI Bank, Kampus UI Depok Branch, and Account Number: 1273000024 under the name of Universitas Indonesia.
- Proof of payment must be submitted to the Directorate of Student Affairs. Cancellation done 3 (three) days before the date of use will be charge a 10% cancellation fee from the paid rent.

Cancellation on the date of use will be charge a 30% cancellation fee from the paid rent.

3.5.4. STUDENT WELFARE AND FACILITY BUILDING (GKFM) / University Health Center

Address : Kampus UI Depok

Phone : +6221-78881019

This building is located in front of the Faculty of Engineering in UI Campus Depok. GKFM / University Health Center Building was built to better serve several important needs of the students, such as:

Polyclinic Unit

Provide a free health service to all students of the Universitas Indonesia. Students only need to provide their Student ID card to process their membership card for future medical record to receive this service. There are several services available:

- a. Public Health Service
- b. Dental Health Service

Service Hours:

Monday - Thursday : 08.00 - 12.30
and 14.00 - 19.00

Friday : 08.00 - 11.00
and 14.00 - 19.00

Saturday : 08.00 - 12.00

Note:

Aside from the above mentioned facilities for students which are funded by the Students Welfare and Facility Fund, GKFM in UI Depok Campus also provide facilities for blood chemistry examinations, x-ray, and cardiac examination for university members with affordable prices.

Pharmacy

The pharmacy provides free medicine for 3 (three) days for UI students who seek treatments in the Polyclinic unit. The pharmacy also provides various other medicines for first aid needs for general public purchase.

UI Student Counseling and Guidance (BKM)

In providing service in the mental welfare of the UI students, the Student Counseling and Guidance is a place where UI students can receive psychological help in dealing with academic, personal or family problems. These psychological help are given in the form of counseling and guidance. Guidance service is the provision of information (to an individual or group) with the purpose of making sure that students are able to learn and build an optimal social relationship. Counseling service is the process of giving help to students and support student in finding a way to solve his problem. Here, a counselor functions as a facilitator.

Services in the UI Student Counseling and Guidance

The routine services provided by the BKM UI are counseling and guidance services daily which are done at:

Service Time : Monday - Friday

Service Hours : 09.00 - 15.00

Place : Student Welfare Center
2nd floor, Student Welfare & Facility Center Building
UI Campus Depok

Phone : +6221-96384797

BKM UI staff of counselors consists of psychologies, psychiatrists, and academic counselors.

Problems handled by BKM UI

Generally, the problems handled by the BKM UI consist of academic, personal, family, and social

problems.

BKM UI's other services:

- Online counseling
- Peer counseling training
- Counseling training for counselor lecturers and BKM management in the faculty level.
- Coordinate meeting between BKM in the university and faculty level.
- Personality development training
- Group therapy

UI Salemba Polyclinic

For students in the UI Salemba Campus, the university also provides similar health service in the polyclinic for public health service.

Service time : Monday - Friday: 08.00 - 12.00
and 14.00 - 18.00

3.5.5. UI STUDENT DORMITORY

Location : UI Campus, Depok

Phone/Fax : +6221- 7874414 /
+6221-7874271

Capacity : 594 rooms for male students housing, 656 rooms for female students housing (including the VIP - AC rooms)

Facility : TV, cafeteria, public pay phone, public internet shops, computer rental

UI Wismarini Student Dormitory

Location : Jl. Otto Iskandar Dinata No. 38, East Jakarta, Indonesia

Phone/Fax : +6221-8195058

Capacity : 72 rooms for male students housing, 111 rooms for female students housing

Facility : Badminton court, TV, cafeteria, Table Tennis

The UI Wismarini student dormitory is provided to students from the Salemba Campus (Faculty of Medicine & Faculty of Dentistry).

Facility

- Standard housing facility: Bed, table, chair, wardrobe, shoe rack, lamp, bathroom, wash basin.
- Technology facility: Public pay phone shops, public internet shop, photocopy
- Public facility: Cafeteria, praying room, laundry service, sport facility, car/motorcycle parking areas, minimart, dormitory market

Room Specification

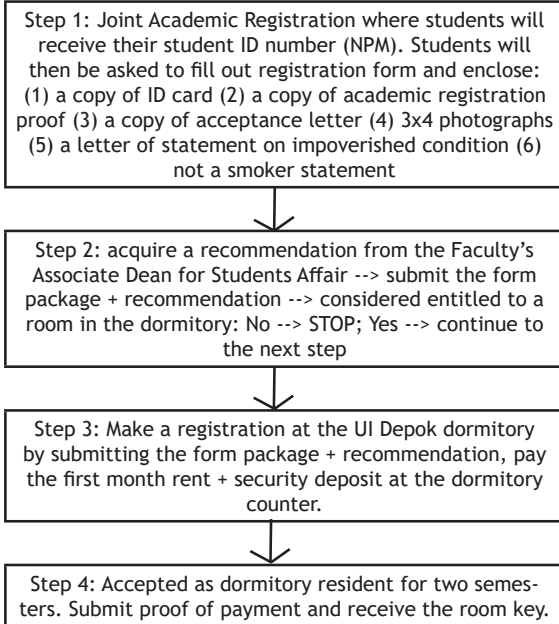
- Standard room: Standard bed, table, chair, bookcase, wardrobe, shoe rack, lamp, outdoor bathroom, non AC.
- Standard plus room: Standard bed, table, chair, book case, wardrobe, shoe rack, lamp, outdoor bathroom, air conditioned.
- Bungur and Melati room: Spring bed mattress, table, chair, indoor bathroom, wash basin, small kitchen, living room, air conditioned.
- VIP room: Spring bed mattress, table, chair, indoor bathroom, wash basin, small kitchen, living room, air conditioned.

Other information

- UI Depok dormitory has their own set of rules and regulations which must be obeyed by all dormitory residents as an attempt to create conducive environment for dormitory residents and as an attempt to maintain harmony among the various elements of the UI Depok dormi-

- tory residents.
- Each undergraduate student residents of the UI Depok dormitory are entitled to live in the dormitory for one year (semesters 1 and 2).
- Residents will be charged for every electronic device which they brought to their dormitory rooms.
- For further information, please contact UI Dormitory secretariat at +6221-78744144 or by clicking <http://asrama.ui.edu>.

Registration Process Flow Chart for UI Dormitory



3.5.6. WISMA MAKARA

Phone : +6221-78883670, 78883671
 Reservation : +6221-78883672
 E-mail : info@makara.cso.ui.ac.id
 Website : <http://www.wismamakara.com>

Wisma Makara, located within the UI Depok campus, is a choice of accommodation for the Southern Jakarta and Depok area. This hotel is very suitable for seminar, training, workshop activities. Surrounded by rubber trees and a lake; the hotel’s cool, calm, and beautiful atmosphere provides the perfect background for your various activities. The hotel’s tranquility also makes it very suitable for those of you who need tranquility to work and rest.

Available facilities:

- 70 fully furnished rooms (AC, TV, refrigerator)
- Restaurant
- Swimming Pool
- Coffee Shop
- Meeting room (up to 100 person capacity)
- Pay phone shop and internet shop
- Photocopy
- Ballroom (with 800 person capacity)
- Parking area

3.5.7. UI STUDENT ACTIVITY CENTER (PUSGIWA)

Location : UI Campus Depok

Phone : +6221-7270201

Pusgiwa UI is a place for various student activities in Universitas Indonesia. Here we can find secretariat offices of various UI student organizations. Pusgiwa also provides many facilities for students' activities such as an 300-400 person auditorium.

3.5.8. UI STUDENTS HALL

Location : UI Salemba Campus

Capacity : 300 People

Phone : +6221-31901355/56

The UI Salemba Student Hall is one of the facilities in UI under the management of Directorate of Student Affairs and Alumni Relation. This hall is often used for various activities such as meetings, seminars, workshops, and many more. The hall is available for use by the university members and public.

3.5.9. SPORT FACILITIES

A. Stadium

- Football field
- Triple Jump Field
- Athletic Field

B. In Door (Gymnasium)

- Badminton court
- Volleyball court
- Basketball court

C. Out Door

- Hockey field
- Basketball court (3 lines)
- Badminton court (1 line)

Permit form or letter for the use of UI Student Activity Center (Pusgiwa), UI Student Hall, and Sport Facilities must be submitted to the Directorate of Student Affairs and Alumni Relation UI located at the Student Activity Center Building, UI Campus Depok.

Phone : +6221-7866403, 7863453

Fax : +6221-7863453

at FTUI, several sport facilities are available: basket ball court, futsal court and climbing wall.

3.5.10. BIKE TO CAMPUS

As a proof to Universitas Indonesia's commitment in implementing the "Go Green" program, UI has provided free bicycles as a mean of transportation within the campus area. Started in 2008, this program establishes collaboration with the Bike to Work and Polygon, making UI the first campus in Indonesia with their own Bike to Campus program.

These bicycles, which colors and form are specially design for UI, are single seat bicycles. By July 2009, there are around 300 units of bicycle available for use and will continue to be added in accordance with the campus development or demand.

How to Borrow:

1. Students simply showed their student ID card (KTM) to officer in charge of each bike shelter.
2. Campus bicycle can only be use on the available bicycle track. It is forbidden to ride them outside of the available track or to take them outside of campus area.
3. Each bicycle is equipped with a trunk with a maximum capacity of 10 kg and is not to be use as a passenger space.
4. Borrowed bicycle is the responsibility of each student until it is returned to the officer in

charge of each bike shelter.

5. Students may return the borrowed bicycle at the nearest bike shelter by showing their student ID card (KTM) to the officer of said shelter.

Service time for Bike to Campus is Monday to Friday, 08.00 - 17.00. For usage outside of service day and time, interested party must coordinate in accordance to the existing regulation.

A few points worth noting in cycling:

Once you've received your borrowed bicycle from the shelter officer, please do the following:

1. Make sure that your bicycle are in good order and function well.
2. Make sure that you have both hand on the bicycle handle, put your books/bags on the provided space.
3. Arrange your seat in accordance to your height, the height of your seat determines your comfort in cycling.
4. Each bicycle has three shifter levels, use them in accordance.
5. Ride the bicycle on the provided track, stay at the left side of the track when passing other bicycle.
6. Pay special care to motorcycles at each crossing.
7. Pay special attention to cycling safety.

3.6. STUDENT ORGANIZATION

Students are a nation's agent of change in making changes towards a fair and prosper independent society. Their power in fighting and struggling toward that goal must always be balanced with moral power as future asset in their fight in realizing the country's objectives. Thus, students need a vessel where all of their independent, family oriented, scientific, society oriented, and open activities can be accommodated. In Universitas Indonesia, this vessel is called Universitas Indonesia Student Society Association (Ikatan Keluarga Mahasiswa Universitas Indonesia - IKM UI).

IKM UI is a formal and legal organization which is the parent organization for all student activities in Universitas Indonesia. IKM UI adopts constitutional values adapted with the need of student lives. Sovereignty of IKM UI lies in the hand of the students and is fully implemented according to Laws and Constitution of IKM UI. The members of IKM UI are registered students in the Universitas Indonesia, consisting of active and regular members. Active members are IKM UI members that have followed active member admission procedures and received recommendation from the faculty. Regular members are IKM UI members that are not registered within the active membership of IKM UI. The symbol of the Universitas Indonesia Student Society Association (IKM UI) is the Makara of Universitas Indonesia with the wording IKATAN KELUARGA MAHASISWA UNIVERSITAS INDONESIA in black.

Student organizations that are incorporated within the IKM UI are:

1. Students Forum
2. Students Representative Council
3. Student Executive Body
4. Financial Audit Agency
5. Student Court
6. Student Element of the Board of Trustees
7. Autonomous Body of the Student Activity Unit
8. Semi Autonomous Body of the Student Activity Unit

Students Representative Council (Dewan Perwakilan Mahasiswa - DPM)

Students Representative Council is the high level body within the Universitas Indonesia Student Society Association (IKM UI) which possesses a legislative power. Members of the DPM UI consist of independent members from each faculties and representatives of legislative bodies of each faculty. Independent members are voted through a general election, while there can only be one

representative from each faculty's legislative body. Membership of DPM UI is inaugurated by a student forum decree. Term of office for members of the DPM UI is one year and ended simultaneously with the inauguration of the new members of the DPM. The requirements for becoming a member of the DPM UI are regulated within the IKM UI laws. DPM UI has the authority in term of legislative, supervision, and assessment of Students Representative Council's (BEM UI) Work Accountability Report, jurisdiction, facility, and designing the admission mechanism and follow up on financial budget plan of each student organizations within the Universitas Indonesia for each period of management. Members of the DPM UI are entitled to interpellation right, voting right, and the right to convey suggestion and express their opinions.

Secretariat : Student Activity Center
 Building (Pusgiwa), 2nd floor
 Phone : +6221-94629107,
 +6285717884964

Students Representative Council (Badan Eksekutif Mahasiswa - BEM)

Universitas Indonesia Students Representative Council is a student organization within the university level with the executive power. Term of office for UI Students Representative Council is one year, from January to December each year. Chairman and Vice Chairman of BEM UI are elected as a couple directly by members of the IKM UI in a Universitas Indonesia General Election. The elected Chairman and Vice Chairman of BEM UI are later officially inaugurated with a Student Forum Decree. Function and authority of BEM UI are, among other: advocate students in issues relating to funds and facilities at the university level; addressing the external politic policy of IKM UI; serve and coordinate with the Universitas Indonesia Autonomy Body of UKM UI, faculty's executive body, and student element of the Board of Trustees. BEM UI Board of Administrators is elected based on open and close recruitment mechanism.

Student Activity Unit (Unit Kegiatan Mahasiswa - UKM)

Student Activity Unit of Universitas Indonesia (UKM-UI) is a place of student activities and creations in the Universitas Indonesia in one area of specialization, talent and religious services at the university level. The Student Activity Unit consists of the Autonomy and Semi Autonomy Bodies. Universitas Indonesia UKM Autonomy Body is a UKM in the university level which is deemed qualified and valid by the decree of the Student Forum into an autonomic UKM UI Autonomy Body. While the Universitas Indonesia UKM Semi Autonomy Body is a place of student activities and creations in the Universitas Indonesia in one area of specialization, talent and religious services at the university level under the coordination of the Students Representative Council.

a. Art

1. Krida Budaya Dance League
2. Madah Bahana Marching Band
3. Mahawarditra Philharmonic
4. Paragita Choir
5. Student Theater

b. Sport

- | | |
|----------------|------------------|
| 1. Badminton | 8. Soft Ball |
| 2. Hockey | 9. Bridge |
| 3. Tennis | 10. Futsal |
| 4. Soccer | 11. Dance Sport |
| 5. Basket Ball | 12. Cricket |
| 6. Swimming | 13. Table Tennis |
| 7. Volley Ball | |

c. Martial Art

1. Taekwondo
2. Merpati Putih
3. Aikido

4. Wushu

d. Religious Groups

1. Moslem Student Society (Nuansa Islam Mahasiswa - SALAM)
2. Catholic Student Society (Keluarga Mahasiswa Katolik - KMK)
3. Oikumene Civitas Academica Society (Persekutuan Oikumene Sivitas Akademika - POSA)
4. Buddhist Student Society (Keluarga Mahasiswa Budhis)
5. Hindu Student Society (Keluarga Mahasiswa Hindu)

e. Academic Group

1. Eka Prasetya Student Study Group (KSM EP)
2. English Debating Society (EDS)

f. Entrepreneurship

1. Student Voice
2. CEDS
3. Student Radio (RTC UI FM) 107,9

g. Others

1. Wira Makara (Student Regiment)
2. Students' Mountaineering Club (Mapala)

3.7. CAREER DEVELOPMENT CENTER (CDC)

Career Development Center is a center with the aim of preparing UI graduates to have more skill and higher level of competitiveness and at the same time channeled UI graduates to the working world. CDC is located in the Student Center Building.

Phone/Fax : +6221-70880577/78881021

Email : cdc-ui@ui.ac.id

FTUI also has a CDC, located at 3rd floor of Engineering Center (EC) Building.

Phone : +6221-78880766

3.8. NATIONAL STUDENT SCIENCE WEEK

The National Student Science Week (Pekan Ilmiah Mahasiswa Nasional - PIMNAS) is a prestigious event for all Universities in Indonesia organized by the Directorate General of Higher Education (DIKTI). The Adikarta Kertawidaya trophy is the award contested at the PIMNAS. PIMNAS is an opportunity to channel the creativity, education and community service of the society in a Student Activities Program. Below is some of the Student Activities Program being contested within the National Student Science Week.

Student Creativity Program - Research (PKM-P)

This program is a research program that aimed to identify the determinants of the quality of the product, find a causal relationship between two or more factors, experimented with a form or equipment, to establish the method of learning, conduct an inventory of resources, modifying existing products, identify the chemical compounds in the plants, testing the efficacy of plant extracts, formulate marketing techniques, a health survey of street children, teaching methods Balinese script in elementary school students, the rate of economic growth in the craft center of Kasongan, superstition factor that characterizes the behavior of the Javanese community and other activities that have such a purpose.

Student Creativity Program - Technology Application (PKM-T)

This program is a technology assistance program (quality of raw materials, prototypes, models, equipment or production processes, waste management, and quality assurance systems and many other) or other micro-or small-scale industries (home industries, small traders or cooperation) as needed by the potential partners in the program. PKMT require students to exchange ideas with

their partner in the program first, because the product is a solution of a problem which the PKMT partner prioritizes. Thus, in the proposed program, the student must attach a Statement of Willingness to Work Together with Partner on a paper with Rp. 6000, - seal.

Student Creativity Program - Entrepreneurship (PKM-K)

This program is the where students develop their skills in entrepreneurship and is a profit oriented program. Business commodities produced can be in the form of goods or services which in turn are one of the basic capital students will need in entrepreneurship and to enter the market.

Student Creativity Program - Community Service (PKM-M)

This program is an assistance program in science, technology, and arts in an effort to increase performance, build business skills, structuring and improving the environment, strengthening community institutions, the socialization of rational drug use, exposure to and understanding aspects of customary law, relief efforts on illiterates in the society and other community programs both for formal and non-formal societies.

Student Creativity Program - Writing Scientific Articles (PKM - AI)

This program is a program of writing a scientific article which originated from student activities in education, research, or community service which the student has done himself (case studies, field practice, community development work, student creativity program, internships, and many other).

Student Creativity Program - Written Concept (PKM - GT)

This program is a program of writing a scientific article that originated from ideas or concepts from a group of students. This written idea refers to an actual problem that can be found in the community and require a smart and realistic solution. In each area these programs are subdivided into seven groups of fields of science, namely:

1. Health field, including: Pharmacy, Nutrition, Obstetrics, Medicine, Dentistry, Nursing, Public Health, and Psychology.
2. Agricultural field, include: Veterinary Medicine, Forestry, Maritime, Fisheries, Agriculture, Animal Husbandry, and Agricultural Technology.
3. Mathematic and Natural Sciences field, including: Astronomy, Biology, Geography, Physics, Chemistry, and Mathematics.
4. Technology and Engineering field, including: Information Technology, Engineering, and Agricultural Technology.
5. Social Economy field, including: Agribusiness (Agriculture), Economic, Social and Political Sciences.
6. Humanities field, including: Religion, Language, Philosophy, Literature, and Art.
7. Education field, including: Education Sciences study program under the Faculty of Education.

Submission deadline for PKM-K, PKM-M, and PKM-P proposals are in October of each year, while deadline proposals for PKM-GT and PKM-AI are in March of each year. Almost all of these areas can be followed by students in 12 faculties at UI. PIMNAS is a means to prove the existence of UI as a research university in Indonesia. Win the Adikarta Kertawidya trophy and show the existence of UI as the Research Campus.

For further information :

<http://bem.ui.ac.id/>

<http://mahasiswa.ui.ac.id/info-pkm-2010.html>

3.9. SCHOLARSHIP

Universitas Indonesia currently manages approximately 71 scholarships both from the government and the private sector. Information about scholarships can be obtained at the Student Affairs Division of each faculty or through the website of the Directorate of Student Affairs at www.mahasiswa.ui.ac.id.

There are two types of scholarship in UI:

- UI Scholarship
- Donor/Sponsor Scholarship

General requirement procedure for scholarship application from Donor/Sponsor:

- Submit application through the Faculty Head with a recommendation from the Associate Dean of Student Affairs.
- Submit a photocopy of academic transcript stating a GPA corresponding with the requirement given by the donor/sponsor.
- Not a smoker.
- Is not a receiver of similar other scholarship.
- Other requirements as stated by the Donor/Sponsor.

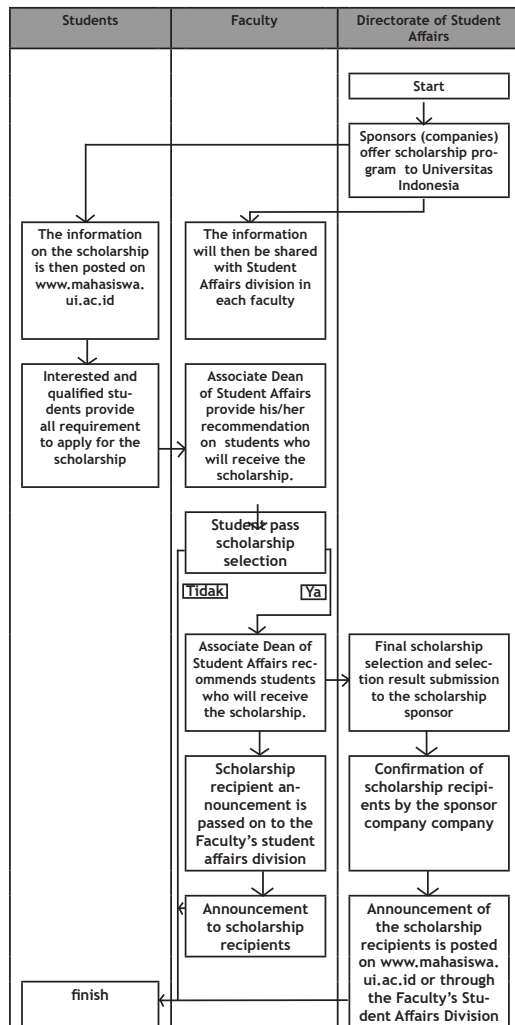
LIST OF NAME OF SCHOLARSHIP DONOR/ SPONSOR FOR UNIVERSITAS INDONESIA STUDENTS

1. Bank BNI 46
2. Bank Central Asia
3. Bank Indonesia
4. Bank KEB Indonesia
5. Bank Lippo
6. Bank Mandiri
 - Bank Mandiri
 - Bank Mandiri Prestasi
7. Bank Mayapada
8. Bank Niaga
9. Bank Permata
10. Bank Tabungan Negara
11. Student Special Aid
 - Special Aid for Undergraduate Program Student
 - Special Aid for Vocational Program Student
12. BAZNAS
13. West Java Scholarship
14. BMU Scholarship
15. CIMB Niaga Excellent Scholarship
16. DKI Jakarta Scholarship
 - Jakarta Achievement Scholarship
 - Jakarta Thesis Scholarship
17. BPMIGAS
18. BRI
19. BUMN
20. DIKNAS
 - Diknas (Excellent Activist Scholarship)
 - Diknas (Excellent Master Scholarship)

- Diknas (Super Excellent Scholarship)
- 21. Diknas 1 (BBM)
- 22. Diknas 2 (PPA)
- 23. Eka 2007 - 2008
- 24. Eka 2008 - 2009
- 25. Eka Cipta (Uang Buku)
- 26. Exxon MOBIL (For Students from Aceh)
- 27. Exxon MOBIL (For Students from Aceh)

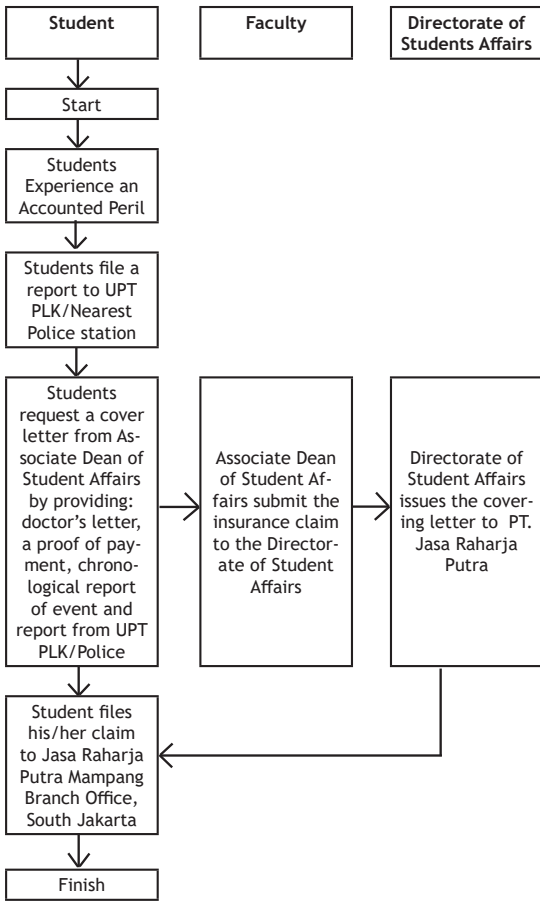
Thesis

28. Indosat
29. Karya Salemba 4 (KS 4)
30. KORINDO
31. **Flowchart of Scholarship Application**



32. MARUBENI
33. MC.DERMONT
34. Part Time Job
35. Posco (Thesis Aid)
36. PPA/BBM Angkatan 2009 - PPA/BBM DIII
- PPA/BBM S1
37. PPE
38. PT. BUMA Apparel Industry
39. PT. Coca Cola
40. PT. Indocement
41. PT. Accenture
42. PT. Sun Life Indonesia
43. PT. Thiess
44. Qatar Charity
45. Recapital
46. Rotary Club Jakarta Sudirman
47. Salim
48. Sariboga
49. Shell (Extention Scheme)
50. Shell (New Scheme)
51. Sime Darby
52. Sumitomo Bank (Supportive Scholarship)
53. Sumitomo Bank (Full Scholarship)
54. Sumitomo Corporation Scholarship
55. Supersemar
56. Tanoto
57. Tanoto S2
58. Total E & P
59. TPSDP (DIKTI)
60. UFJ Foundation / Mitsubishi
61. Unilever
62. Y. Asahi Glass (YAGI)
63. Y. Toyota (REGULER)
64. Yayasan IJARI
65. Yayasan Goodwill Internasional
66. YAYASAN TIFICO
67. YKPP - Pertamina - YKPP - Pertamina (Living Allowance)
- YKPP - Pertamina (Tuition Fee)

Insurance Claims Process



Cause	Condition	Required Document
Train Accident	Injured	1. A notification letter from the Faculty's Associate Dean of Student Affairs to the Directorate of Students Affairs.
		2. Accident Report issued by the police
		3. Treatment report from the attending doctor
		4. Original receipt from the hospital or the attending physician
	Death	1. A notification letter from the Faculty's Associate Dean of Student Affairs to the Directorate of Students Affairs.
		2. Accident Report issued by the police
		3. Accident Report from Polsuska (PT. KAL)
		4. Autopsy report from the hospital
		5. Death Certificate
		6. A copy of the victim's birth certificate
		7. A copy of Family Card
		8. Heir certificate letter from the local district office.
Road Accident	Injured	1. A notification letter from the Faculty's Associate Dean of Student Affairs to the Directorate of Students Affairs.
		2. Accident Report issued by the police
		3. Treatment report from the attending doctor
		4. Original receipt from the hospital or the attending physician and the pharmacy
	Death	1. A notification letter from the Faculty's Associate Dean of Student Affairs to the Directorate of Students Affairs.
		2. Accident Report issued by the police
		3. Accident Report from Transportation Agency
		4. Autopsy report from the hospital
		5. Death Certificate
		6. A copy of the victim's birth certificate
		7. A copy of Family Card
		8. Heir certificate letter from the local district office.

3.10. INSURANCE

Each student enrolled in Universitas Indonesia for each running semester (participate in academic activities) will also be registered as an insurance member of PT. Asuransi Jasa Raharja.

For these insured students, they are allowed to submit an insurance claim in accordance with the following provisions:

- Accidents included within the insurance claim are accidents which occurred during the student's journey from home to UI campus to participate in academic and extracurricular activities whether it is within or outside of Campus area and with the UI/Faculty's Management's knowledge and permission.
- Compensation on claim regarding students' accident is only applicable to those who have paid the DKFM fee for the semester.
- In the event of an accident, student must report the accident no later than 3x24 hours to the office of the Universitas Indonesia Directorate of Student Affairs Sub Directorate of Student Welfare Services or the nearest PT Jasa Raharja Office Branch.
- If after 180 (one hundred and eighty) days, the accident is not reported, insurance compensation shall be canceled.
- Compensation claim (for victims suffering from injuries) must be submitted by attaching the original and valid receipt from doctor/hospital/clinic that treated the student's injuries.
- Non-medical care or treatment is not compensable.
- Students may send their inquiries regarding any matter that are not listed here directly to the Universitas Indonesia Head of Student Welfare Sub Directorate at the Central Administration Building, Universitas Indonesia Campus, Depok.

Compensation Receivable from the Insurance Claim *)

Death due to an accident :

Rp. 5.000.000, -

Permanent disability due to accident :

Rp. 10.000.000, -

Care / medical Treatment due to accident (maximum payment) :

Rp. 3.500.000, -

*) Subject about to change without notice

3.11. GENERAL INFORMATION

Post Office, Depok Campus

The Depok Campus Post Office offers postage stamp sales, special delivery mail delivery, registered mail, parcel post, money orders, checks and postal giro and savings services such as Batara. Address: Ground Floor Integrated Student Services Center (PPMT) Building, UI ,Depok Campus, 16424

Important Phone Numbers

UI Campus Salemba

Phone : +6221-330343, 3303455

Fax : +6221-330343

UI Campus Depok

Phone : +6221-7270020, 7270021, 7270022, 7270023, 7863460

Firefighters : 116

SAR : 55 021

Ambulance

RSCM : 118

Accidents : 119, 334 130

Police (on duty) : 525011

Police station

Central Jakarta : 3909922

North Jakarta : 491 017

South Jakarta : 7206011
 West Jakarta : 5482371
 East Jakarta : 8191478
 Depok : 7520014

3.12. INTERNATIONAL JOURNAL OF TECHNOLOGY

International Journal of Technology (IJTech) is bi-annual international referred journal with the objectives to explore, develop, and elucidate the knowledge of engineering design and technology, to keep practitioners and researchers informed on current issues and best practices, as well as serving as a platform for the exchange of ideas, knowledge, and expertise among technology researchers and practitioners.

International Journal of Technology provides an opportunity to share detailed insights from different understandings and practices associated with technology. It provides an international forum for cross-disciplinary exchange of insights and ideas regarding value and practices for dissemination. International Journal of Technology will publish your work to international society of practitioners and researchers with interest in technology design and development from a wide variety of sectors.

Website: www.ijtech.eng.ui.ac.id

3.13. QUALITY IN RESEARCH (QiR) CONFERENCE

QiR Conference is a bi-annual international conference organized by FTUI since 1998. The 13th QiR was held in Yogyakarta from 25 - 28 June 2013. It was attended by over 400 participants from 16 different countries in the world. This conference provide a chance for students, be it undergraduate, master or doctoral program students, to present their research findings in front of an international audience. The 14th QiR will be held in August 2015. For more detail information on Qir, please visit: <http://qir.eng.ui.ac.id>.

3.14. INTERNATIONAL OFFICE

International Office is the university division dedicated to support the internationalization goals of the university and to handle international mobility involving the university and the international civitas academica. Their goal is to assist the international students and scholars handle their academic-related matters at Universitas Indonesia and to bridge Universitas Indonesia's civitas academica with overseas universities. Universitas Indonesia has a worldwide cooperation with various universities all over the world. These cooperations include not only academic but also research collaborations, giving the international access and exposure to its entire proud member.

The International Office of Universitas Indonesia provides various services such as: Bilateral Cooperation (University to University Cooperation), Regional Cooperation (International Associations & International Forums), Government to Government Cooperation (G to G), International Learning and Teaching, Student Exchange, Double Degree, Sandwich Program, Visiting Scholars, Study abroad, Scholarship Opportunities, International Research and Research Training, International Knowledge Transfer; are some of the services provided by the International Office. These opportunities are open for all university members from lecturers to students, be it in their Bachelor, Master or Ph.D program. Students can benefit from these programs in experiencing a once in a life time chance to study and understand different academic cultures in the world.

For further information, please contact:
 Central Administration Building
 1st Floor, Universitas Indonesia
 Kampus Depok, Jawa Barat 16424
 Phone/fax : +62 21 - 7888 0139
 Email : intofui@yahoo.com, io-ui@ui.ac.id
 Milist : internationaloffice@yahoogroups.com
 Twitter : @intofui

The cover features a central image of a tree on a plaza with a clock tower in the background. The image is split vertically: the left side is a dark blue gradient, and the right side is a light gray gradient. The text 'UNDERGRADUATE PROGRAM' is centered in white serif font, flanked by two horizontal white lines. A large white diagonal shape is on the left, and a blue horizontal bar is at the top. A blue diagonal bar is at the bottom.

UNDERGRADUATE PROGRAM

4.5. UNDERGRADUATE PROGRAM IN ELECTRICAL ENGINEERING

Program Specification

1.	Awarding Institution	Universitas Indonesia Double Degree: Universitas Indonesia and partner university	
2.	Teaching Institution	Universitas Indonesia Double Degree: Universitas Indonesia and partner university	
3.	Programme Tittle	Undergraduate Program in Electrical Engineering	
4.	Class	Regular, Parallel, International	
5.	Final Award	Sarjana Teknik (S.T) Double Degree: Sarjana Teknik (S.T) and Bachelor of Engineering (B.Eng)	
6.	Accreditation / Recognition	BAN-PT: A accredited AUN-QA	
7.	Language(s) of Instruction	Bahasa Indonesia and English	
8.	Study Scheme (Full Time / Part Time)	Full Time	
9.	Entry Requirements	High school /equivalent, or D3 / Polytechnique / equivalent, AND pass the entrance exam.	
10.	Study Duration	Designed for 4 years	
	Type of Semester	Number of Semester	Number of weeks / semester
	Regular	8	17
	Short (optional)	3	8
11.	Graduate Profiles: Bachelor of engineering who is able to design both hardware and/or software as solution in electrical engineering problem based on technological advancement in accordance with professional ethics.		
12.	Expected Learning Outcomes: General outcomes: <ol style="list-style-type: none"> 1. Able to design of the hardware. 2. Able to design of the software. 3. Able to handle general issues and specific in electrical engineering. 4. Able to apply the basic principles of mathematics, physics, and statistics in solving electrical engineering. 5. Capable of critical thinking, creative, and innovative and have the intellectual curiosity to solve problems at the level of the individual and the group. 6. Able to identify varieties of entrepreneurial efforts that are characterized by innovation and self-reliance based on ethics. 7. Able to use the language both spoken and written in the Bahasa Indonesia and English for academic or non-academic activities. 8. Able to provide alternative solutions to problems that arise in the environment, society, nation, and country. 9. Able to utilize information communication technology (ICT). Electronics Engineering Stream Outcomes: <ol style="list-style-type: none"> 1. Able to analyse photonic devices. 2. Able to design advanced electronics circuit. 3. Able to design MEMS. 4. Able to design VLSI circuit. 5. Able to analyse state of the art in the field of electronics and photonics. 6. Able to utilize technological advancement to solve problems related to his/her expertise (stream). 		

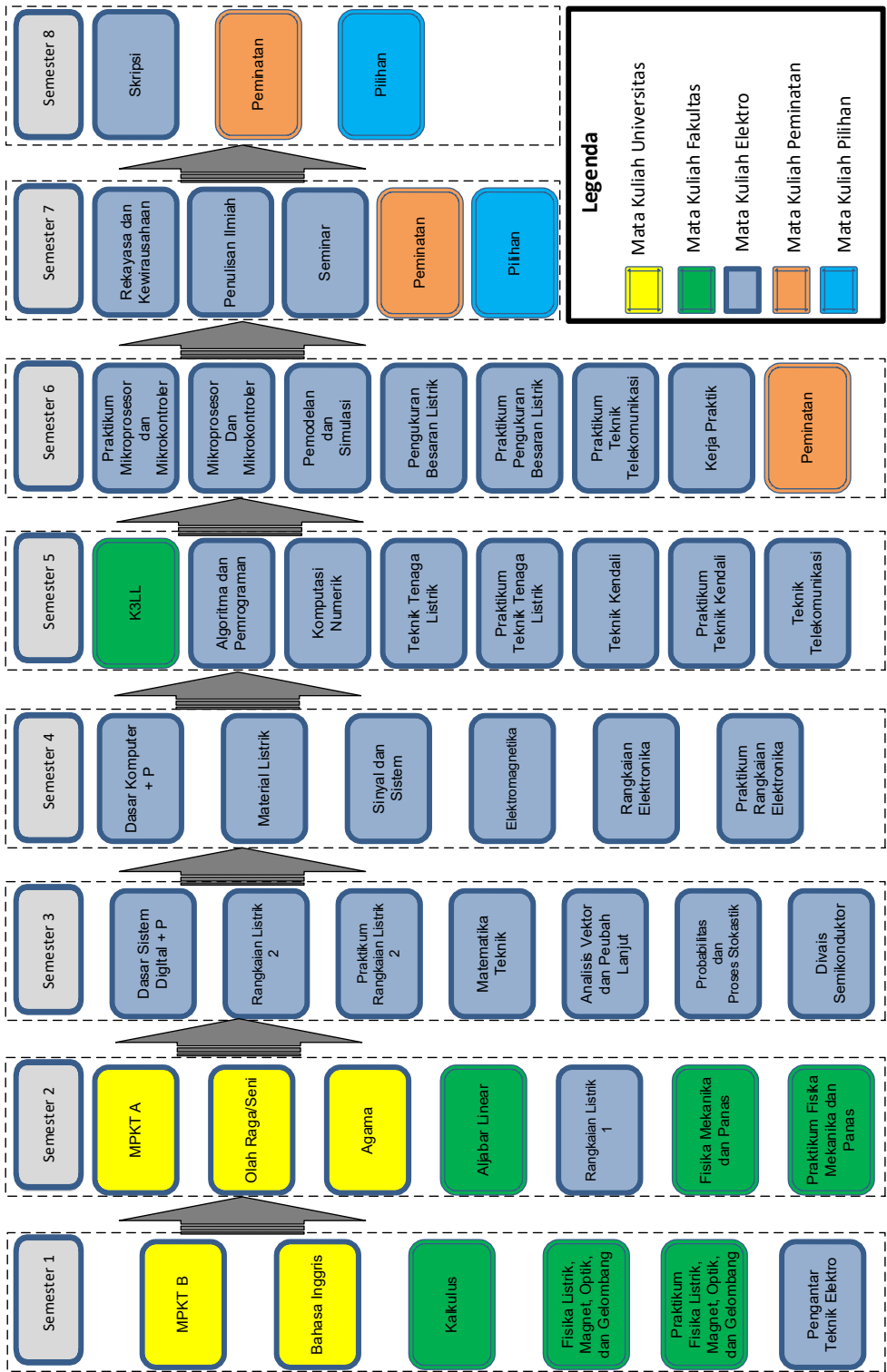
12.	<p>Telecommunication Engineering Stream Outcomes:</p> <ol style="list-style-type: none"> 1. Able to design wire and wireless communication equipment system. 2. Able to design communication network system 3. Able to analyse the performance of communication systems on different media. 4. Able to identify the process of information signal processing. 5. Able to examine the development of telecommunications engineering 6. Able to study the latest technology to solve the problem of appropriate areas of expertise (Stream) <p>Control Engineering Stream Outcomes:</p> <ol style="list-style-type: none"> 1. Able to identify dynamic control system in mathematical equation. 2. Able to design discrete controller. 3. Able to design knowledge-based controller. 4. Able to reverse engineer simple controller. 5. Able to study the latest technology to solve the problem of appropriate areas of expertise (Stream) <p>Electrical Power Engineering Stream:</p> <ol style="list-style-type: none"> 1. Able to characterize electric power engineering and energy. 2. Able to review the latest technology to solve the problem of electric power and energy fields. 3. Able to analyze the phenomenon of high field to resolve the problems of the field of electric power. 4. Able to itemize the problems of electric power and energy. 5. Able to design simple application in the fields of electric power and energy. 6. Able to study the latest technology to solve the problem of appropriate areas of expertise (Stream). <p>Biomedical Engineering Stream Outcomes:</p> <ol style="list-style-type: none"> 1. Able to apply the basic principles of biology in field of biomedicine engineering. 2. Able to apply the techniques, skills and modern tools that are necessary in the practice of biomedicine engineering. 3. Able to analyse medical data/information related to the condition of human physiology. 4. Able to make simple medical device design at the level of individuals and groups. 5. Able to process medical signal to improve the performance of a medical device. 6. Able to study the latest technology to solve the problem of appropriate areas of expertise (Stream). 		
13	Classification of Subjects		
No.	Classification	Credit Hours (SKS)	Percentage
i	University General Subjects	18	12,5 %
ii	Basic Engineering Subjects	18	12,5 %
iii	Core Subjects	71	49,31 %
iv	Stream Subject	21	14,58 %
iv	Elective Subjects	8	5,56 %
v	Special Subject (Internship, Seminar, Undergraduate Thesis)	8	5,56 %
	Total	144	100 %
14.	Total Credit Hours to Graduate		144 SKS

Career Prospects

The graduates of this program have been employed in various industrial companies within one month (in average) after the graduation. Some of them are involved in power engineering, IT, electronic, oil & gas, telecommunication and other related industries. Some of graduates were even employed before the graduation.

Some occupation or job titles that are suitable for this program are electrical engineer, process engineer, control engineer, instrumentation engineer, program manager, project manager, technical manager and professional lecturers.

FLOW DIAGRAM OF SUBJECTS



ELECTRICAL ENGINEERING

Diagram Alir Mata Kuliah Prasyarat Untuk Mata Kuliah Praktikum

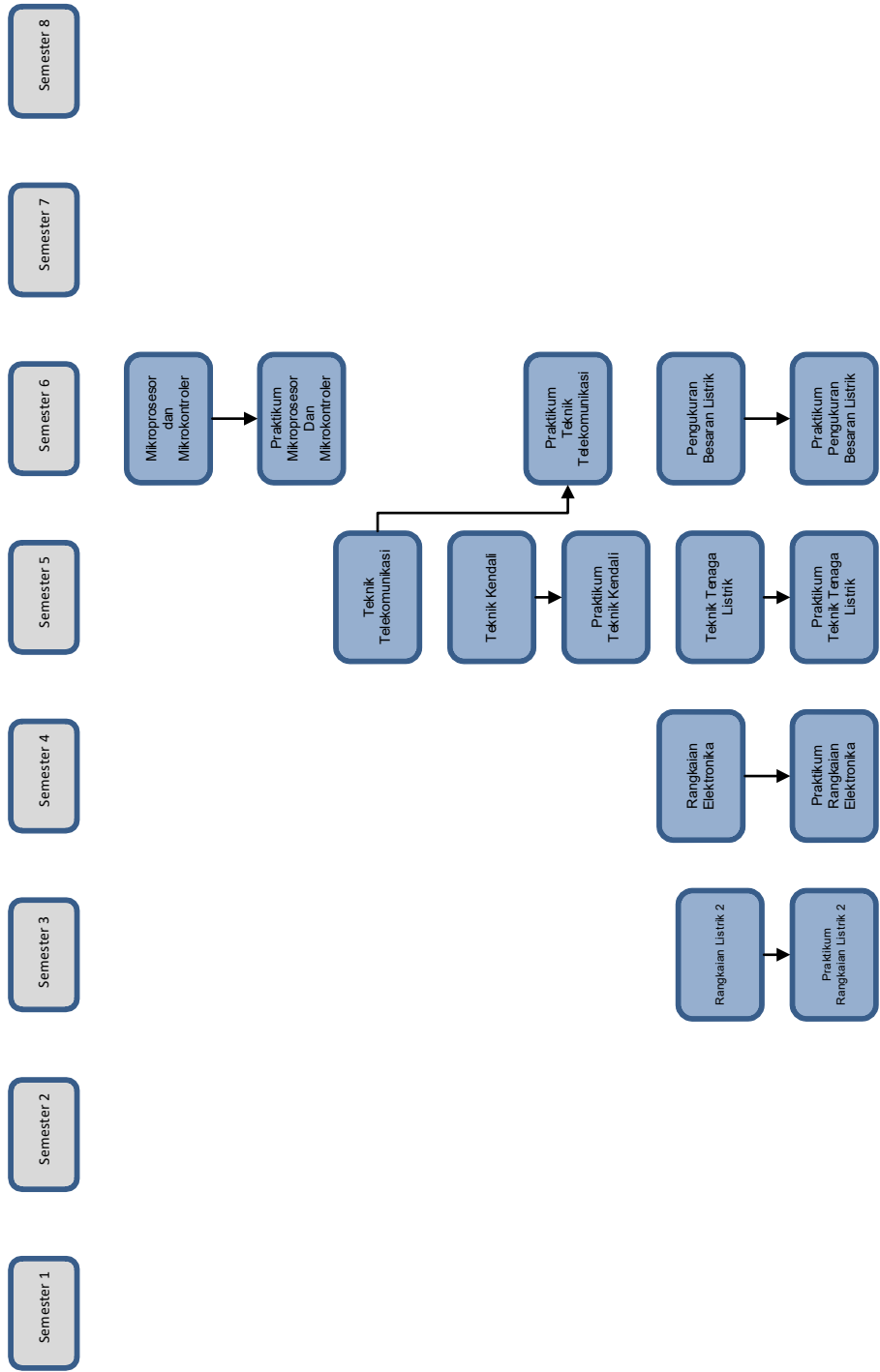
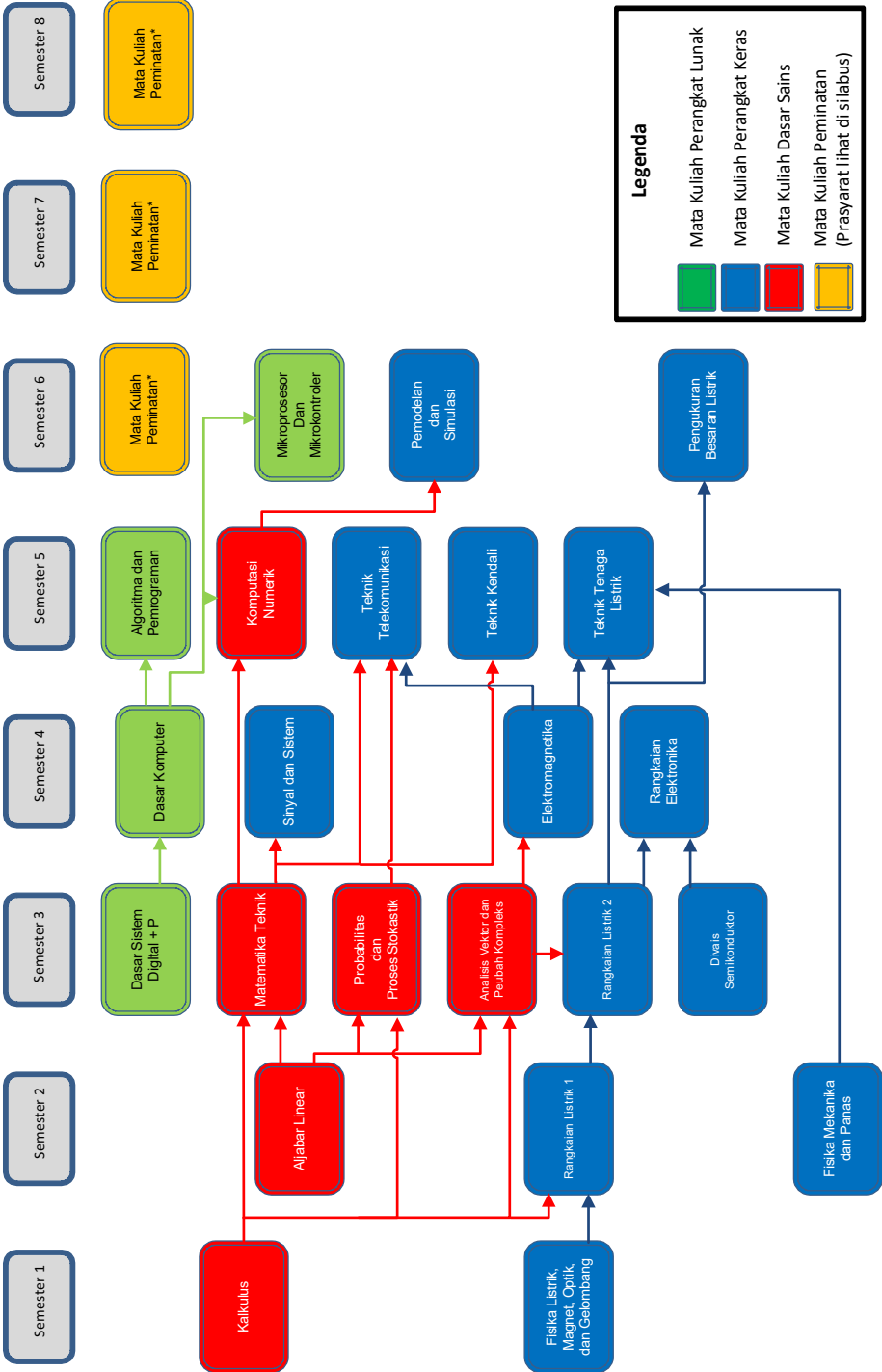


Diagram Alir Mata Kuliah Prasyarat Untuk Mata Kuliah Non Praktikum



**COURSE STRUCTURE UNDERGRADUATE PROGRAM
ELECTRICAL ENGINEERING**

KODE	MATA AJARAN	SUBJECT	SKS
Semester 1		1st Semester	
UIGE600002	MPKT B	Integrated Character Building B	6
UIGE600003	Bahasa Inggris	English	3
ENGE600003	Kalkulus	Calculus	4
ENGE600007	Fisika Listrik, MGO	Physics (Electricity, MWO)	3
ENGE600008	Prak. Fisika Listrik, MGO	Physics (Electricity, MWO) Lab	1
ENEE601001	Pengantar Teknik Elektro	Intro to Electrical Engineering	2
		Subtotal	19
Semester 2		2nd Semester	
UIGE600001	MPKT A	Integrated Character Building A	6
UIGE600010 - UIGE600015	Agama	Religion	2
UIGE600020 - UIGE600048	Olah Raga/Seni	Sports/Arts	1
ENGE600004	Aljabar Linier	Linear Algebra	4
ENGE600005	Fisika Mekanika dan Panas	Physics (Mechanics and Thermal)	3
ENGE600006	Prak. Fisika Mekanika dan Panas	Physics (Mechanics and Thermal) Lab	1
ENEE602002	Rangkaian Listrik 1	Electric Circuit 1	3
		Subtotal	20
Semester 3		3rd Semester	
ENEE603003	Rangkaian Listrik 2	Electric Circuit 2	3
ENEE603004	Praktikum Rangkaian Listrik	Electric Circuit Laboratory	1
ENEE603005	Analisis Vektor dan Peubah Kompleks	Vector Analysis Complex Variable	2
ENEE603006	Probabilitas dan Proses Stokastik	Probability and Stochastic Process	3
ENEE603007	Matematika Teknik	Engineering Mathematics	4
ENEE603008	Divais Semikonduktor	Semiconductor Devices	2
ENEE603009	Dasar Sistem Digital + P	Fund. of Digital System & Lab	3
		Subtotal	18
Semester 4		4th Semester	
ENEE604010	Dasar Komputer dan Praktikum	Basic Computer and Laboratory	3
ENEE604011	Rangkaian Elektronika	Electronic Circuits	3
ENEE604012	Praktikum Rangkaian Elektronika	Electronic Circuits Laboratory	1
ENEE604013	Elektromagnetika	Electromagnetics	4
ENEE604014	Sinyal dan Sistem	Signal and Systems	3
ENEE604015	Material Listrik	Electric Materials	2
		Subtotal	16
Semester 5		5th Semester	
ENGE600012	K3LL	HSE Protection	2
ENEE605016	Komputasi Numerik	Numerical Computation	2

ENEE605017	Teknik Telekomunikasi	Telecommunication Engineering	3
ENEE605018	Teknik Tenaga Listrik	Electric Power Engineering	3
ENEE605019	Praktikum Teknik Tenaga Listrik	Electric Power Engineering Lab	1
ENEE605020	Teknik Kendali	ControlEngineering	3
ENEE605021	Praktikum Teknik Kendali	ControlEngineering Laboratory	1
ENEE605022	Algoritma dan Pemrograman	Algorithm and Programming	4
		Subtotal	19
	Semester 6	6th Semester	
ENEE606023	Kerja Praktik	Internship	2
ENEE606024	Pemodelan dan Simulasi	Modelling and Simulations	2
ENEE606025	Prakt. Teknik Telekomunikasi	Telecommunication Engineering Lab.	1
ENEE606026	Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller	4
ENEE606027	Prakt. Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller Lab.	1
ENEE606028	Pengukuran Besaran Listrik	Electric Measurements	2
ENEE606029	Praktikum Pengukuran Besaran Listrik	Electric Measurements Laboratory	1
	Peminatan Kelompok Ilmu	Majoring Courses	9
		Subtotal	22
	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Engineering Entrepreneurship	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
	Peminatan Kelompok Ilmu	Majoring Courses	6
	Pilihan	Electives	4
		Subtotal	16
	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Theses	4
	Peminatan Kelompok Ilmu	Majoring Courses	6
	Pilihan	Electives	4
		Subtotal	16
		TOTAL	144

CURRICULUM STRUCTURE TELECOMMUNICATION ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
	Semester 6	6th Semester	
ENEE606023	Kerja Praktik	Internship	2
ENEE606024	Pemodelan dan Simulasi	Modelling and Simulations	2
ENEE606025	Prakt. Teknik Telekomunikasi	Telecommunication Engineering Lab.	1
ENEE606026	Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller	4
ENEE606027	Prakt. Mikroprosesor dan Mikrokontroler	Microprocessor & Microcontroller Lab.	1

ENEE606028	Pengukuran Besaran Listrik dan Elektronik	Electric and Electronic Measurements	2
ENEE606029	Praktikum Pengukuran Besaran Listrik	Electric Measurements Laboratory	1
ENEE606301	Teknik Pengkodean dan Aplikasi	Coding Technique and Applications	3
ENEE606302	Jaringan Komunikasi	Communication Networks	3
ENEE606303	Komunikasi Multimedia Pita Lebar	Broadband Multimedia Communications	3
		Subtotal	22
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Engineering Entrepreneurship	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE607304	Antena dan Propagasi	Antennas and Propagation	3
ENEE607305	Komunikasi Optik	Optical Communications	3
	Pilihan	Electives	4
		Subtotal	16
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEE608307	Komunikasi Bergerak dan Nirkabel	Mobile and Wireless Communications	3
ENEE608308	Divais Sistem Komunikasi	Communication System Devices	3
	Pilihan	Electives	4
		Subtotal	14

CURRICULUM STRUCTURE ELECTRICAL POWER ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
	Semester 6	6th Semester	
ENEE606023	Kerja Praktik	Internship	2
ENEE606024	Pemodelan dan Simulasi	Modelling and Simulations	2
ENEE606025	Prakt. Teknik Telekomunikasi	Telecommunication Engineering Lab.	1
ENEE606026	Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller	4
ENEE606027	Prakt. Mikroprosesor dan Mikrokontroler	Microprocessor & Microcontroller Lab.	1
ENEE606028	Pengukuran Besaran Listrik dan Elektronik	Electric and Electronic Measurements	2
ENEE606029	Praktikum Pengukuran Besaran Listrik	Electric Measurements Laboratory	1
ENEE606101	Konversi Energi Listrik	Electric Energy Conversion	2
ENEE606102	Elektronika Daya dan Praktikum	Power Electronics and Laboratory	3
ENEE606103	Manajemen dan Ekonomi Teknik	Management and Engineering Economy	3
		Subtotal	21
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Engineering Entrepreneurship	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2

ENEE607104	Sistem Tenaga Listrik danPraktikum	Electric Power System and Laboratory	3
ENEE607105	Teknik Tegangan & ArusTinggi +P	High Current & Voltage Eng + Lab	3
ENEE607106	Instalasi Listrik Bangunan	Building Electric Installation	2
	Pilihan	Electives	4
		Subtotal	18
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEE608108	Distribusi & Transmisi Tenaga Listrik	Electric Power Trans. & Distribution	3
ENEE608109	Proteksi Sistem Tenaga Listrik	Electric Power System Protection	2
	Pilihan	Electives	4
		Subtotal	13

CURRICULUM STRUCTURE ELECTRONICS ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
	Semester 6	6th Semester	
ENEE606023	Kerja Praktik	Internship	2
ENEE606024	Pemodelan dan Simulasi	Modelling and Simulations	2
ENEE606025	Prakt. Teknik Telekomunikasi	Telecommunication Engineering Lab.	1
ENEE606026	Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller	4
ENEE606027	Prakt.Mikroprosesor dan Mikrokontroler	Microprocessor & Microcontroller Lab.	1
ENEE606028	Pengukuran Besaran Listrik dan Elektronik	Electric and Electronic Measurements	2
ENEE606029	Praktikum Pengukuran Besaran Listrik	Electric Measurements Laboratory	1
ENEE606201	Rangkaian Elektronika Lanjut	Advanced Electronic Circuits	3
ENEE606202	Divais Fotonik	Photonic Devices	3
ENEE606203	Fabrikasi Divais Semikonduktor +P	Semiconductor Device Fabr + Lab	3
		Subtotal	22
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa danKewirausahaan	Engineering Entrepreneurship	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE607204	Pengantar Nanoelektronik	Introduction of Nanoelectronics	3
ENEE607205	VLSI	VLSI	3
	Pilihan	Electives	4
		Subtotal	16
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEE608207	Sel Surya	Solar Cell	3
ENEE608208	MEMS	MEMS	3
	Pilihan	Electives	4

		Subtotal	14
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CURRICULUM STRUCTURE CONTROL ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
	Semester 6	6th Semester	
ENEE606023	Kerja Praktik	Internship	2
ENEE606024	Pemodelan dan Simulasi	Modelling and Simulations	2
ENEE606025	Prakt. Teknik Telekomunikasi	Telecommunication Engineering Lab.	1
ENEE606026	Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller	4
ENEE606027	Prakt. Mikroprosesor dan Mikrokontroler	Microprocessor & Microcontroller Lab.	1
ENEE606028	Pengukuran Besaran Listrik dan Elektronik	Electric and Electronic Measurements	2
ENEE606029	Praktikum Pengukuran Besaran Listrik	Electric Measurements Laboratory	1
ENEE606401	Sistem Kendali Digital	Digital Control System	3
ENEE606402	Sistem Kendali Proses	Process Control System	3
ENEE606403	Sistem Kendali Penggerak Elektrik	Electric Drive Control System	3
		Subtotal	22
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Engineering Entrepreneurship	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE607404	Robotika	Robotics	3
ENEE607405	Sistem Kendali Prediktif & Adaptif	Adaptive & Predictive Control System	3
	Pilihan	Electives	4
		Subtotal	16
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEE608407	Mekatronika	Mechatronics	3
ENEE608408	Sistem Berbasis Pengetahuan	Knowledge Based System	3
	Pilihan	Electives	4
		Subtotal	14

MATA KULIAH PILIHAN		
KODE	MATA AJARAN	SKS
ENEE607306	Topik Khusus Telekomunikasi 1	2
ENEE608309	Topik Khusus Telekomunikasi 2	2
ENEE607107	Topik Khusus Tenaga Listrik 1	2
ENEE608110	Topik Khusus Tenaga Listrik 2	2
ENEE607306	Topik Khusus Elektronika 1	2
ENEE608309	Topik Khusus Elektronika 2	2
ENEE607406	Topik Khusus Kendali 1	2

ENEE608409	Topik Khusus Kendali 2	2
ENEE607506	Topik Khusus Biomedik 1	2
ENEE608509	Topik Khusus Biomedik 2	2

CURRICULUM STRUCTURE BIOMEDICAL ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
	Semester 6	6th Semester	
ENEE606023	Kerja Praktik	Internship	2
ENEE606024	Pemodelan dan Simulasi	Modelling and Simulations	2
ENEE606025	Prakt. Teknik Telekomunikasi	Telecommunication Engineering Lab.	1
ENEE606026	Mikroprosesor dan Mikrokontroler	Microprocessor and Microcontroller	4
ENEE606027	Prakt. Mikroprosesor dan Mikrokontroler	Microprocessor & Microcontroller Lab.	1
ENEE606028	Pengukuran Besaran Listrik dan Elektronik	Electric and Electronic Measurements	2
ENEE606029	Praktikum Pengukuran Besaran Listrik	Electric Measurements Laboratory	1
ENEE606501	Biologi dan Anatomi	Biology and Anatomy	3
ENEE606502	Sistem Komunikasi Medik	Medical Communication System	3
ENEE606503	Pengantar Teknologi Biomedik	Introduction to Biomedical Technologies	3
		Subtotal	22
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Engineering Entrepreneurship	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE607504	Teknologi Pencitraan Medik	Medical Imaging Technology	3
ENEE607505	Pemodelan Sistem Medik	Medical System Modelling	3
	Pilihan	Elective	4
		Subtotal	16
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Final Project	4
ENEE608507	Instrumentasi Biomedik + P	Biomedical Instrumentations + Lab	3
ENEE608508	Informatika Medik	Medical Informatics	3
	Pilihan	Elective	4
		Subtotal	14

FAST-TRACK CURRICULUM (S1 AND S2)

FAST TRACK CURRICULUM TELECOMMUNICATION ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
Kode	Semester 7	7th Semester	

ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Rekayasa dan Kewirausahaan	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE603007	Matematika Terapan	Applied Mathematics	3
ENEE606303	Komunikasi Multimedia Pita Lebar	Broadband Multimedia Communications	3
ENET801002	Sistem Radar dan Disain	Radar Systems and Design	3
ENET801003	Pengolahan Sinyal dan Aplikasi	Digital Signal Processing & Apps	3
ENEE607304	Antena dan Propagasi	Antennas and Propagation	3
ENEE607305	Komunikasi Optik	Optical Communications	3
		Subtotal	24
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEE802002	Metodologi Penelitian	Research Method	3
ENET802004	Teknik Sistem Medis Nirkabel	Wireless Medical System Eng.	3
ENET802005	Disain RF Lanjut	RF Engineering Design	3
ENET802006	Disain Antena Modern	Modern Antenna Design	3
ENMT803007	Komunikasi Multimedia Nirkabel	Multimedia Wireless Communications	3
ENEE608308	Divais Sistem Komunikasi	Communication System Devices	3
		Subtotal	22
Kode	Semester 9	9th Semester	
ENET803007	Tek. Komunikasi Gelombang Cahaya	Lightwave Communication Technology	3
ENET803008	Topik Khusus Telekomunikasi	Special Topic in Telecommunication	2
ENEE803003	Manaj. & Keekonomian Proyek Teknik	Engineering Economy & Project Manag.	3
		Subtotal	8
Kode	Semester 10	10th Semester	
ENEE804005	Publikasi Ilmiah	Publication	2
ENEE804004	Tesis	Thesis	8
		Subtotal	10

FAST TRACK CURRICULUM ELECTRONICS ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Rekayasa dan Kewirausahaan	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENEF801001	Disain Rangkaian Terpadu	Integrated Circuit Design	3
ENEF801002	Nanoelektronika	Nanoelectronics	3
ENEF801003	Divais Fotonik Lanjut	Advanced Photonic Devices	3
ENEE606204	Pengantar Nanoelektronik	Introduction of Nanoelectronics	3
ENEE606205	VLSI	VLSI	3

		Subtotal	24
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEF802004	Disain MEMS	MEMS Design	3
ENEF802005	Divais Solid State	Solid State Device	3
ENEF802006	Divais Hetero-struktur	Hetero-structure Devices	3
ENEE802002	Metodologi Penelitian	Research Method	3
ENEE606207	Sel Surya	Solar Cell	3
ENEE606208	MEMS	MEMS	3
		Subtotal	22
Kode	Semester 9	9th Semester	SKS
ENEE803003	Manaj. & Keekonomian Proyek Teknik	Engineering Economy & Project Manag.	3
ENEF803007	Sistem Optik Koheren	Optical Coherent System	2
ENEF803008	Sistem Pengukuran Metode Optik	Optical Method for Measurement	3
		Subtotal	8
Kode	Semester 10	10th Semester	SKS
ENEE804005	Publikasi Ilmiah	Publication	2
ENEE804004	Tesis	Thesis	8
		Subtotal	10

FAST TRACK CURRICULUM ELECTRICAL POWER ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Rekayasa dan Kewirausahaan	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENEP801001	Operasi & Kendali Pembangkitan TL	Power Generation Ops & Control	3
ENEP801002	Mutu dan Kualitas Daya Sistem TL	Electrical Power System Quality	3
ENEP801003	Energi dan Lingkungan	Energi and Environment	3
ENEE607104	Sistem Tenaga Listrik dan Praktikum	Electric Power System and Laboratory	3
ENEE607105	Teknik Tegangan & Arus Tinggi +P	High Current & Voltage Eng + Lab	3
		Subtotal	24
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Final Project	4
ENEE802002	Metodologi Penelitian	Research Method	3
ENEP802004	Sistem Dinamik dan Pemodelan	Dynamic System and Modeling	3
ENME802004	Manajemen & Ekonomi Energi	Economics Energy and Management	3
ENEP802006	Elektronika Daya Industri	Industrial Power Electronics	3

ENEE608108	Distribusi & Transmisi Tenaga Listrik	Electric Power Trans. & Distribution	3
ENEE608109	Proteksi Sistem Tenaga Listrik	Electric Power System Protection	3
		Subtotal	22
Kode	Semester 9	9th Semester	
ENEE803003	Manaj. & Keekonomian Proyek Teknik	Engineering Economy & Project Manag.	3
ENEP803007	Topsus Ketenagalistrikan & Energi	Topics in Power System and Energy	2
ENEP803008	Perencanaan Sistem Tenaga Listrik	Power System Planning	3
		Subtotal	8
Kode	Semester 8	8th Semester	
ENEE804005	Publikasi Ilmiah	Publication	2
ENEE804004	Tesis	Thesis	8
		Subtotal	10

FAST TRACK CURRICULUM CONTROL ENGINEERING STREAM

KODE	MATA AJARAN	COURSE	SKS
Kode	Semester 7	7th Semester	
ENEE607030	Seminar	Seminar	2
ENEE607031	Rekayasa dan Kewirausahaan	Rekayasa dan Kewirausahaan	2
ENEE607032	Penulisan Ilmiah	Academic Writing	2
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENEC801001	Kendali Analog dan Dijital	Analog and Digital Control	3
ENEC801002	Topik Khusus Riset Terkini	Special Topic on Advance Research	3
ENEC801003	Pemodelan dan Rekayasa Sistem	Modeling and System Engineering	3
ENEE607404	Robotika	Robotics	3
ENEE607405	Sistem Kendali Prediktif & Adaptif	Adaptive & Predictive Control System	3
		Subtotal	24
Kode	Semester 8	8th Semester	
ENEE608033	Skripsi	Bachelor Thesis	4
ENEE802002	Metodologi Penelitian	Research Method	3
ENEC802004	Sistem Kendali Multivariabel	Multivariable Control Systems	3
ENEC802005	Robotika Cerdas	Intelligent Robotics	3
ENEC802006	Kendali Adaptif dan Optimal	Adaptive and Optimal Control	3
ENEE608407	Mekatronika	Mechatronics	3
ENEE608408	Sistem Berbasis Pengetahuan	Knowledge Based System	3
		Subtotal	22
Kode	Semester 9	9th Semester	
ENEC803007	Kendali dan Sistem Cerdas	Intelligent System and Control	3
ENEC803008	Kendali Lanjut Sistem Penggerak Elektrik	Advanced Control on Electric Drive System	2
ENEE803003	Manaj. & Keekonomian Proyek Teknik	Engineering Economy & Project Manag.	3

Kode	Semester 10	10th Semester	Subtotal
ENEE804005	Publikasi Ilmiah	Publication	2
ENEE804004	Tesis	Thesis	8
		Subtotal	10

CURRICULUM OF INTERNATIONAL PROGRAM ELECTRICAL ENGINEERING

KODE	Course	SKS
1st Semester		
ENEE611001	Fund. of Digital Systems + Lab	3
ENEE611002	Academic Writing	2
ENGE610003	Calculus	4
ENGE610007	Physics (Electricity, MWO)	3
ENGE610008	Physics (Electricity, MWO) Lab	1
ENEE611003	Intro to Electrical Engineering	2
ENEE611004	Electric Materials	2
	Subtotal	17
2nd Semester		
ENEE612005	Basic Computer and Laboratory	3
ENEE612006	Semiconductor Devices	2
ENGE610004	Linear Algebra	4
ENGE610005	Physics (Mechanics and Thermal)	3
ENGE610006	Physics (Mechanics and Thermal) Lab	1
ENEE612007	Engineering Mathematics	4
ENEE612008	Electric Circuit 1	3
	Subtotal	20
3rd Semester		
ENEE613009	Electric Circuit 2	3
ENEE613010	Algorithm and Programming	4
ENEE613011	Vector Analysis Complex Variable	2
ENEE613012	Electric Circuit Laboratory	1
ENEE613013	Electrical Power Engineering	3
ENEE613014	Electrical Power Engineering Laboratory	1
ENEE613015	Telecommunication Engineering	3
ENEE613016	Telecommunication Engineering Lab.	1
ENEE613017	Probability and Stochastic Process	3
	Subtotal	21
4th Semester		
ENEE614018	Control Engineering	3
ENEE614019	Control Engineering Laboratory	1
ENEE614020	Electronics Circuits	3
ENEE614021	Electronics Circuits Laboratory	1

ENEE614022	Electromagnetics	4
ENEE614023	Electric Measurements	2
ENEE614024	Electric Measurements Lab.	1
ENEE614025	Numerical Computation	2
ENEE614026	Signal and Systems	3
	Subtotal	20
5th Semester		
ENEE615027	Microprocessor and Microcontroller	4
ENEE615028	Microprocessor and Microcontroller Lab.	1
UIGE610004	Integrated Character Building B	6
ENEE615029	Digital Control Systems	3
ENEE615030	Communication Networks	3
ENEE615031	Power Electronics and Laboratory	3
	Subtotal	20
6th Semester		
ENEE616032	Internship	2
ENEE616033	Modelling and Simulation	2
UIGE600010 - UIGE600015	Religion	2
UIGE610001	Integrated Character Building A	6
ENEE616034	Introduction of Nanoelectronics	3
ENEE616035	Communication System Devices	3
	Subtotal	18
7th Semester		
UIGE600020 - UIGE600048	Sports/Arts	1
ENGE610012	HSE Protection	2
ENEE617036	Seminar	2
ENEE617037	Engineering Entrepreneurship	2
ENEE617038	Electric Power System and Lab	3
ENEE617039	Process Control Systems	3
ENEE617040	Photonic Devices	3
NEW	Electives	2
	Subtotal	18
8th Semester		
NEW	Electives	6
ENEE618041	Bachelor Thesis	4
	Subtotal	10
	Total	144

Electives:

ENEE617101 Object Oriented Programming + Lab	3
ENEE618102 Software Engineering	3

**THE SYLLABUS
UNIVERSITY COURSES**

**UIGE600001
MPKT A**

Learning Outcomes:

Capable of critical thinking, creative, innovative; have the intellectual curiosity to solve problems at the individual and group level.

Able to provide problem-solving alternative against various problems arising in the environment, society, nation, and country.

Topics:

The power and primacy of the character, the basics of philosophy, logic, foundations of ethics, whether it's human, individual and group, society and culture

Prerequisites: none

Textbook:

1. Evita e. Singgih, Miranda D.Z., Ade Solihat, Jossy p. Moeis, " Buku Ajar I Kekuatan dan Keutamaan Karakter, Filsafat, Logika dan Etika ", University of Indonesia
2. Evita e. Singgih, Miranda D.Z., Ade Solihat, Jossy p. Moeis, " Buku Ajar II Manusia sebagai Individu, Kelompok dan Masyarakat ", University of Indonesia

**UIGE600002
MPKT B**

Learning Outcomes:

Capable of critical thinking, creative, innovative; have the intellectual curiosity to solve problems at the individual and group level.

Able to provide problem-solving alternative against various problems arising in the environment, society, nation, and country.

Topics:

The power and primacy of the character, the basics of philosophy, logic, foundations of ethics, whether it's human, individual and group, society and culture

Prerequisites: none

Textbook:-

**UIGE600003
ENGLISH**

Learning Outcomes:

Able to use spoken and written English well for both academic and non-academics activities.

Topics:

Study skills: active learner, vocabulary building, word formation and using the dictionary, listening strategies, extensive reading

Grammar: Basic grammar of sentences, clause. Reading: reading skills: skimming, scanning, main ideas, supporting ideas; Note taking reading popular science article, reading an academic text

Listening: short conversation, lecture and note-taking, news broadcast, short story

Speaking: discussion, giving presentation

Writing: summary of short articles, self-describing graphs and tables, academic paragraphs, essays

Prerequisites: none

Textbook:

**UIGE600020 - UIGE600048
SPORTS/ARTS**

See the academic guidebook of Faculty of Engineering

**UIGE600010 - UIGE600015
RELIGION**

See the academic guidebook of Faculty of Engineering

FACULTY COURSES

**ENGE600003
CALCULUS (4 CREDITS)**

Learning Outcomes:

Able to apply advanced mathematical concepts for electrical engineering; Able to apply mathematical concepts of functions and limits, derivative (single/multivariable) and its applications, integrals (single/multifold) and its applications, Taylor series, and Maclaurin series

Topics:

Functions and limits, Derivative (single/multivariable) and applications, integrals (single/multifold) and its applications, Taylor and Maclaurin series

Prerequisites: none

Textbook: none

**ENGE600004
LINEAR ALGEBRA (4 CREDITS)**

Learning Outcomes:

Able to apply the concept of Linear equations systems, Determinants, vector spaces, the space Results In Time, value and Eigen Vectors, as well as a Linear transformation

Topics:

The concept of Linear equations System, Determinants, vector spaces, the space Results in Time, value and Eigen Vectors, Linear transformation

Prerequisites: none

Textbook: none

**ENGE600005
PHYSICS (MECHANICS AND THERMAL) (3 CREDITS)**

Learning Outcomes:

Able to apply the concepts of basic physics, mechanics and thermodynamics in understanding nature and engineering phenomena including its applications.

Topics:

Mechanics of motion, gravity, the potential energy of the particle dynamical, works and energy, momentum, rotational motion, collision, kinematics and dynamic, angular momentum Physics Heat-Sound, temperature, heat, laws of thermodynamics I and II, kinetic gas theory I and II, Modern Physics-Quantum

Prerequisites: none

Textbook:

Haliday, Resnick, Walker, and *Principles of Physics 9th Edition*, Wiley, 2011.

**ENGE600006
PHYSICS (MECHANICS AND THERMAL) LAB**
See the academic guidebook of Faculty of Engineering

**ENGE600007
PHYSICS (ELECTRICITY, MWO) (3 CREDITS)**

Learning Outcomes:

Able to apply the concepts of basic physics, electricity, magnetism, optics, and waves in understanding nature and engineering phenomena including its applications.

Topics:

A static electric charge, Coulomb, electric field, Gauss law, electric potential, Capacitor and dielectric. Dynamic power, current, and prisoners, Ohm's law, electrical, electrochemical potential difference, the electric circuit. Field magnetism, magnetic motive force and flow, the effects of Hall, law ampere, the intensity of the magnetic field B, Biot-Savart's law, the law of Faraday, inductance, electromagnetics, oscillations, Maxwell's equations.

Prerequisites: none

Textbook:

Haliday, Resnick, Walker, and *Principles of Physics 9th Edition*, Wiley, 2011.

PHYSICS (ELECTRICITY, MWO) LAB

See the academic guidebook of Faculty of Engineering

ENGE600012

HSE PROTECTION

See the academic guidebook of Faculty of Engineering

ELECTRICAL ENGINEERING COURSES

ENEE611003

ENEE601001

INTRO TO ELECTRICAL ENGINEERING (2 CREDITS)

Learning Outcomes:

Able to explain the basic concepts of electrical engineering and its application in everyday life.

Topics:

Basic concepts and its applications of: Electronics Engineering, telecommunications engineering, Control Engineering, electric engineering and energy, and biomedical engineering.

Prerequisites: none

Textbook:

Diklat Pengantar Teknik Elektro UI

ENEE612008

ENEE602002

ELECTRIC CIRCUITS 1 (3 CREDITS)

Learning Outcomes:

Able to calculate the electric charge, current, and voltage in a series basis; Able to explain voltage source, current source (free/bound), resistors, and capacitors; Being able to compute the independent circuit using the superposition theorem, the transformation of the source, and Thevenin-Norton; Able to calculate the electric circuit analysis using the variables node (current series), mesh, super-node (circuit voltage), super-mesh; Being able to analyze the response time a series order and order-1-2;

Topics:

Concept: current, voltage, power, and energy; Voltage source, current source (free/bound), resistors, and capacitors; Resistive circuit of series and parallel; Analysis of node, super-node, mesh, super-mesh; Superposition theorem, the transformation of the source, and Thevenin-Norton; Response time-order series 1 and 2

Equipment:

Prerequisite: Calculus, Physics (electricity, mwo).

Textbook:

1. David e. Johnson, Johnny r. Johnson, John l. Hilburry, Peter d. Scott, "Electric Circuit Analysis", 3rd Edition, Prentice Hall International, Inc., 1997. (Chapter 1-9)
2. James w. Nilsson, Susan a. Riedel, "Electric Circuits", 6th Edition, Prentice Hall International, Inc., 2000. (Chapter 1-10)

ENEE613009

ENEE603003

ELECTRIC CIRCUITS 2 (3 CREDITS)

Learning Outcomes:

Being able to make a simple electric circuit design; Able to analyze a 3-phase circuit; Able to analyze electric circuit of frequency response order-1 and order-2; Able to analyze basic circuits shared ideal transformer and inductance; Able to make design of passive and active filter circuits by utilizing basic circuits; Able to analyze a 4 poles circuit.

Topics:

3 phase circuits; Laplace transform; frequency response; shared inductance circuits; 1 order filter circuits passive and active; 4 poles circuits.

Prerequisite: Electric Circuits 1, Vector Analysis and Complex Variables.

Textbook:

1. James w. Nilsson, Susan a. Riedel, "Electric Circuits", 6th Edition, Prentice Hall International, Inc., 2000 (Chapter 11-18).
2. David e. Johnson, Johnny r. Johnson, John l. Hilburry, Peter d. Scott, "Electric Circuit Analysis", 3rd Edition, Prentice Hall International, Inc., 1997 (Chapter 10-17).

ENEE613012

ENEE603004

ELECTRIC CIRCUIT LABORATORY (1 CREDITS)

Learning Outcomes:

Able to calculate the electric charge, current, and voltage in a series basis; Able to explain voltage source, current source (free/bound), resistors, and capacitors; Being able to compute the independent circuit using the superposition theorem, the transformation of the source, and Thevenin-Norton; Able to analyze circuit ammeter, voltmeter, ohmmeter, and wheat-stone bridge; Able to calculate the electric circuit analysis using the variables node, super-node, mesh, super-mesh;

Topics:

Basic electricity; linearity analysis-mesh and knot; analysis of superposition; Thevenin and Norton; poles series circuits; alternating current circuits; three phases circuits;

Prerequisite: Electric Circuits 1

Textbook: Modul Praktikum Rangkaian Listrik - Laboratorium Tegangan Tinggi dan Pengukuran Listrik.

ENEE613011

ENEE603005

VECTOR ANALYSIS COMPLEX VARIABLE (2SKS)

Learning Outcomes:

Able to apply advanced mathematical concepts to the field of electrical engineering that includes the complex variable, Cauchy-Riemann equation, Integral Cauchy; Able to apply basic vector differential, integral vector (line, surface and volume), Green's theorem, the Divergence theorem, Gauss and Stokes ; Able to apply the concept of Vector calculus, Complex numbers and functions

Topics:

Complex variables, complex numbers and functions, polar form, powers and roots, de Moivre theorem, dot and cross products, limit. The derivatives, the analytic function. The Cauchy-Riemann equations, Laplace equation, exponential, trigonometric and hyperbolic functions, logarithm and general power. Complex integration, line integrals in complex plane, the Cauchy integral theorem and formula, derivatives of analytic functions. Laurent series, singularities, zeros and infinity, residue integration method and residue, integration of real integrals. With a conformal mapping, Complex analysis and potential theory. Vector differential calculus, vector in 2-space and 3-space. The inner (dot) Product and vector (cross) product, vector and scalar functions and fields. Derivatives, the gradient of scalar fields. Directional derivatives. The divergence and the curl of the vector field. Line integral, the path independence of line integrals. Double integrals, Green's theorem in the plane, the Surfaces for surface integrals, Triple integrals. Divergence theorem of Gauss, Stokes's theorem.

Prerequisite: Calculus, Linear Algebra

Textbook:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, Wiley Publishers.
2. Glyn James, "Advanced Modern Engineering Mathematics", 2nd Edition, Prentice Hall Publishers, 1999.

ENEE613017

ENEE603006

PROBABILITY AND STOCHASTIC PROCESSES (3 CREDITS)

Learning Outcomes:

Able to apply the concepts of probability and stochastic processes in the field of electrical engineering.

Topics:

The distribution function of a random variable, probability, discrete probability distributions, and continuous, normal, Poison, gamma, Chi-squared, Beta logarithm Weibull, the transforma-

tion of the probability distribution, the sampling distribution of one and two sample Estimation, hypothesis tests one and two sample, linear regression and stochastic models, its correlation, Autoregressive Moving Average Model, Autoregressive Moving Average models, Markov chains.
Prerequisite: Calculus, Linear Algebra

Textbook:

1. r. d. Yates and d. j. Goodman, "Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers", 2nd Edition, Wiley, 2004.
2. j. a. Gubner, "Probability and Random Processes for Electrical and Computer Engineers", Cambridge, 2006.
3. Ronald e. Walpole, Raymond h. Myers, Sharon l. Myers, Keying Ye, and "Probability & Statistics for Engineering & Scientists, 7th Edition, Pearson Education International, USA, 2002

ENEE603009

ENEE611001

Fund. of Digital System & Lab (3 SKS)

Learning Outcomes: In this course, students will learn all design phases and implementations of a digital system. At the end of the course, students will be able to analyze simple digital circuits, and able to design digital systems using combinational and simple sequential building blocks. This lecture also involves several practical work in the laboratory to design, implement and verify digital logic systems using digital circuit simulation software.

Topics: Boolean Algebra Principles and applications; Interface Logic Families; Number System & Data Encoding; Basic Logic Circuits; Basic Modular Design of Combinational Circuits; Basic Modular Design of Sequential Circuits.

Practical work: Module 1-Introduction and introduction to Digital Circuit Basics, Module 2 - Boolean Algebra and Elementary logic gates, Module 3 - Karnaugh Map, Module 4 - complex logic gate, Module 5 - Decoder and Encoder, Module 6 - Multiplexer and De-multiplexer, Module 7- Digital Arithmetic Circuit, Module 8 - Flip-Flop and Latch, Module 9-Registers and Counters, Module 10 - Group Project

Prerequisite: none.

Textbook:

1. M. Morris Mano, r. Charles r. Kime, Tom Martin, Logic & Computer Design Fundamentals, 5th ed., Prentice Hall, 2000
2. Ronald j. Tocci, Neal s. Widmer, and Gregory l. Moss, Digital Systems: Principles and Applications, 11th ed., Prentice Hall, 2010
3. Basics of Digital System Lab. Practice Modules

ENEE612007

ENEE603007

ENGINEERING MATHEMATICS (4SKS)

Learning Outcomes:

Able to apply differential equations and several transformation functions for solving problems in the field of electrical engineering.

Topics:

Ordinary Differential Equations (and Constant Coefficient is not constant), Partial Differential Equations, Difference Equations, Laplace transform, Fourier series, Fourier transform, Z Transformation

Prerequisites : Calculus, Linear Algebra

Textbook:

1. Erwin Kreyszig, "Advanced Engineering Mathematics," 9th Edition, Wiley Publishers, 2006.
2. Glyn James, "Advanced Modern Engineering Mathematics," Second Edition, Prentice Hall Publishers, 1999.

ENEE612006

ENEE603008

SEMICONDUCTOR DEVICES (2 CREDITS)

Learning Outcomes:

The student is able to apply the concept of physical Bonds were able to apply the concept of physical semiconductor material in electronics; An extension of the metal-semiconductor; An extension of p-n; An extension of current in p-n; Bipolar transistor: basic characteristics; The

system of metal-oxide-semiconductor; Metal-Oxide-Semiconductor Field-Effect Transistors; 8 the development of the Electronic Device

Topics:

The Concept of Bonding, Electronics semiconductor material; An extension of the metal-semiconductor; An extension of p-n; An extension of current in p-n; Bipolar transistor: basic characteristics; The system of metal-oxide-semiconductor; Metal-Oxide-Semiconductor Field-Effect Transistors; 8 the development of the Electronic Device

Prerequisites : No

Textbook:

1. Howe, r. t., and c. g. Sodini, “ *Microelectronics: An Integrated Approach* “. Upper Saddle River, NJ: Prentice Hall, 1996.
2. Fonstad, C. G. “ *Compatible Devices and Circuits* “, New York, NY: McGraw-Hill, 1994.

ENEE603009

FUND. OF DIGITAL SYSTEM & LAB (3 CREDITS)

Learning Outcomes:

Able to analyze a simple digital system circuit; Able to make digital system design using a simple sequential and combinational block.

Topics:

The principles of Boolean and its application; Interface Logic Families; Number System & Data Encoding; Basic Logic Circuits; Basic Modular Design of Combinational Circuits; Basic Modular Design of Sequential Circuits.

Practical work: module 1-Introduction and basic introduction to Digital Circuit, module 2-Boolean Algebra and Elementary logic gates, module 3 - Karnaugh Map, module 4 - logic gate complex, module 5-Decoder and Encoder, Multiplexer and De-multiplexer 6-module 7-Series Digital Arithmetic Module 8-Flip-Flop and Latch, Module 9-Registers and counters, Module 10-Basic Practical Digital System Project

Prerequisite: none.

Textbook:

1. M. Morris Mano, r. Charles r. Kime, Tom Martin, Logic & Computer Design Fundamentals, 5th ed., Prentice Hall, 2000
2. Ronald j. Tocci, Neal s. Widmer, and Gregory l. Moss, Digital Systems: Principles and Applications, 11th ed., Prentice Hall, 2010
3. Basic Practical Digital systems Module

ENEE612005

ENEE604010

BASIC COMPUTER AND LABORATORY (3 CREDITS)

Learning Outcomes:

Able to explain types and function of computer hardware; Able to make the draft algorithms to solve the problem of computation and manipulation of data; Able to make the draft algorithms: Pseudocode, Flowcharts, Looping, selection/Branching; Able to implement the algorithm into a high level programming language and low level; Able to implement the Matlab Script; Able to implement the structure and control in the language of C; Able to implement modular programming in C language.

Topics:

The history of the computer, computer hardware Components, operating systems, computer networks; Pseudocode; Flowchart; Looping; Selection/Branching; Matlab Script; Structure and control in the C language.

Prerequisite: Basic System digital and Practical.

Textbook:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy, “Technology in Action (TiA),” Second Edition, Prentice-Hall, 2006.
2. Gary b. Shelly Misty e. Vermaat and, “Discovering Computers 2011: Living in a Digital World,” Course Technology, Cengage Learning, 2011.
3. Deitel & Deitel, “C How to Program,” 5th Edition, Pearson Education, 2007.

ENEE614020

ENEE604011

ELECTRONIC CIRCUITS (3 CREDITS)

Learning Outcomes:

Able to apply the basic concepts of electronics; Able to analyze basic electronics circuits; Able to compose electronic circuits by using electronic devices

Topics:

Series diode transistor circuits, the circuit configuration of power supply transistors, transistor applications; Frequency Response, a series of *amplifiers*

Prerequisite: Semiconductor device, Power Series 1, Series 2 Electric

Textbook:

Boylestad R, Nashhelsky L (2006), Electronic Devices and Circuit Theory, 9th Edition, Prentice Hall, New Jersey, USA.

ENEE614021**ENEE604012****ELECTRONIC CIRCUITS LABORATORY (1 CREDITS)**

Learning Outcomes:

Able to apply the basic concepts of electronics; Being able to practice the workings of a diode, transistor, circuit configuration, frequency response, *amplifiers*; Able to use electronic measuring instrument

Topics:

Series diode transistor circuits, the circuit configuration of power supply transistors, transistor applications; response frequency, the circuit *amplifier*.

Prerequisites : Electronic Circuit.

Textbook:

Electronic Circuit Teaching Modules - Electronic Laboratory.

ENEE614022**ENEE604013****ELECTROMAGNETICS (4SKS)**

Learning Outcomes:

Able to apply physical concept for electrical engineering; Able to apply Maxwell's equations on solving the problem of time variation in the form of an integral and differential, energy storage, and quasi static field and analysis of wave in time domain.

Topics:

Electrostatic, Magneto-static, Electromagnetic dynamic, Plane Waves, Maxwell's Laws, Electromagnetic Interference, transmission line

Prerequisite: Complex Variables and Vector analysis

Textbook:

1. Stuart m. Wentworth, "Fundamentals of Electromagnetics with Engineering Applications", John Wiley, 2005.
2. Fawwaz T Ulaby, "Fundamentals of Applied Electromagnetics", Prentice Hall Publications, 2001.

ENEE614026**ENEE604014****SIGNAL AND SYSTEMS (3 CREDITS)**

Learning Outcomes:

Able to apply physical concept for electrical engineering; Able to apply the concept of linear systems for signal processing and digital filter design

Topics:

Other types of signals and linear systems, the characteristics of the system time fixed (LTI), review of the Fourier transform, the discrete time Fourier transform, digital Fourier transform, Laplace, sampling and reconstruction of discrete time signals, the transformation of analog filter design, Z.

Prerequisite: Engineering Mathematics

Textbook:

1. Simon Haykin & Barry Van Veen, "Signals and systems", 2nd Edition John Wiley & Sons publishers, 2003.
2. Alan v. Oppenheim, Alan s. Willsky, s. Hamid Nawab, "Signals and Systems", Prentice Hall; 2nd Edition, 1996.

ENEE611004

ENEE604015

ELECTRIC MATERIAL (2 CREDITS)

Learning Outcomes:

Able to explain the classification of electric materials; Being able to analyze the problems of electrical material;

Topics:

Description of the electrical material, bonds of the molecule, the arrangement of atoms in the solid, dielectric polarization, electric material classification

Prerequisites:-

Textbook:

Rudy Setiabudy, "Material Teknik Listrik", UI Press, 2007

R. e. Hummel, "Electronic Properties of Materials", Third Edition, Springer, 2000

ENEE614025

ENEE605016

NUMERICAL COMPUTATION (3 CREDITS)

Learning Outcomes:

Able to apply numerical methods in the form design computing algorithms and data manipulation;

Topics:

The design of algorithms for numerical Methods: a search for roots, numerical methods for the resolution of systems of linear equations, numerical methods a search of curve fitting, numerical methods for differential and integral, numerical methods for ordinary differential equations; The Concept Of Interpolation

Prerequisite: Engineering Mathematics, Basic Computer

Textbook:

Steven Chapra, Canale Raymond. "Numerical Methods for Engineers 7th Edition", McGraw Hill. 2014.

ENEE613015

ENEE605017

TELECOMMUNICATION ENGINEERING (3 CREDITS)

Learning Outcomes:

Able to apply the basic concept of telecommunications engineering; Able to apply the concept of global communication systems; Capable of analyzing analog and digital modulation; Able to explain telephony system; Able to calculate the PCM and TDM, Digital Line Coding; Able to analyze telecommunications network: a basic Phone, the technique of grafting, signaling techniques, the concept of Queuing, a communications network radio, *microwave*, and fiber optics

Topics:

Global communication systems; analog and digital modulation; telephony system; PCM and TDM; Digital Line Coding; telecommunications network: a basic phone, connection, signaling, and the concept of the queue; communications network radio, *microwave*, and fiber optics

Prerequisites : Probability and stochastic processes, mathematical techniques, and Electromagnetics

Textbook:

1. Simon Haykin, "Communication Systems", 5th Edition, John Wiley & Sons, Inc., 2008.
2. Roger I. Freeman, "Telecommunication Systems Engineering", 4th Edition, John Wiley & Sons, Inc., 2004.

ENEE605018

ELECTRIC POWER ENGINEERING (3 CREDITS)

Learning Outcomes:

Able to explain the concept of electric that includes generation, transmission and distribution;
Being able to compute the parameters of electric machines.

Topics:

The basic Mechanical and electromagnetic, circuit of Three phase transformer, the basics of Machine Flow back and forth, Synchronous Machine, Parallel Operation of Synchronous Generators, Induction Motors, direct current Motors, transmission line, equation and Representation system, introduction of a power Flow Study, disturbance of symmetric and Asymmetric

Prerequisite: Electrical Circuits.

Textbook:

S. j. Chapman, "Electric Machinery and Power System Fundamentals," McGraw-Hill Science/Engineering/Math, 2001.

ENEE605019

ELECTRIC POWER ENGINEERING LAB (1 CREDITS)

Learning Outcomes:

Capable of testing characteristics of electric machines; Being able to classify the electrical machines

Topics:

Direct Current Machines, Transformers, Synchronous Machines, Induction Machines

Prerequisite: Electrical Circuits.

Textbook:

Electric Power Engineering Teaching Modules-Power Energy Conversion Laboratory

ENEE614018

ENEE605020

CONTROL ENGINEERING (3 CREDITS)

Learning Outcomes:

Able to apply the basic concept of control; Able to apply the concept of block diagrams, Time Response, system stability and steady-state error, root locus, frequency response; Capable of designing controllers with the bode diagram, and is able to analyze the state-space, capable of governing designing state-space,.

Topics:

Block diagrams; Time Response; The stability of the system; Steady-state error; Root locus; Frequency response; Design controllers with root locus; Design of controller with bode diagram; The state-space model analysis; Governing state-space design; Design Observer

Prerequisite: Engineering Mathematics

Textbook:

1. Nise, n. "Control Systems Engineering", 4th Edition, Wiley, 2005.
2. Katsuhiko Ogata, "Modern Control Engineering" 4th Edition, Prentice Hall, 2002.

ENEE614019

ENEE605021

CONTROL ENGINEERING LABORATORY (1 CREDITS)

Learning Outcomes:

Able to use the device data acquisition; Able to apply the response time, system stability and steady error, root locus design, frequency response, controllers with root locus, Bode's diagram with controller design, the introduction of PLC, state-space.

Topics:

Response time, system stability and steady error, root locus design, frequency response, controllers with root locus, Bode's diagram with controller design, the introduction of PLC, state-space

Prerequisite: Engineering Control
 Textbook:
 Laboratory Workbook - Control Systems Laboratory.

ENEE613010
ENEE605022
ALGORITHM AND PROGRAMMING (4 CREDITS)

Learning Outcomes:
 Able to make the draft algorithms to solve the problem of computation and manipulation of data; Able to apply the concepts: Modular; Iteration and Recursion; Sorting; Searching; Array; Pointers; Linked List

Topics:
 Modular; Iteration and Recursion; Sorting; Searching; Array; Pointers; Linked List; Static and dynamic data structures in C language

Prerequisites : Basic of computer

Textbook:

1. Thomas h. Cormen, "Introduction to Algorithms", 3rd Edition, MIT Press, 2009
2. Robert Sedgewick & Kevin Wayne, "Algorithms", 4th ed., Addison-Wesley Professional, 2011

ENEE616033
ENEE606024
MODELLING AND SIMULATION (3 CREDITS)

Learning Outcomes:
 Able to establish mathematical model system, capable of performing the analysis of mathematical models of the system, able to build simulations based on mathematical models, Capable of analyzing simulation system.

Topics:
 Basic modelling and simulation, methods of modeling of physical systems, analysis of the model of non-linear dynamical systems, dynamical models of simulation with Matlab/Simulink, Data modeling, system identification, data exploration methods, methods of optimization of the smallest squares model, validation, data modeling with Matlab/Simulink.

Prerequisite: Numerical Computing

Textbook:

1. Harold Klee, Randal Allen, "Simulation of Dynamic Systems with MATLAB and Simulink", CRC Press, 2011
2. William j. Palm III, "System Dynamics", 2nd Edition, McGraw-Hill, 2005.
3. John a. Sokolowski, Catherine m. Banks, "Modeling And Simulation Fundamentals", John Wiley & Sons, 2010

ENEE613016
ENEE606025
TELECOMMUNICATIONS ENGINEERING LAB (1 CREDITS)

Learning Outcomes:
 Able to put into practice the basic concept of telecommunications engineering; Being able to practice the communication system globally; analog and digital modulation; telephony system; PCM and TDM; Digital Line Coding; telecommunication network: telecommunications network: a basic Phone, the technique of grafting, signaling techniques, the concept of Queuing, a communications network radio, *microwave*, and fiber optic; Able to use the measure of telecommunications.

Topics:
 Global communication systems; analog and digital modulation; Telephony system; PCM and TDM; Digital Line Coding; FIR Filters; the parameters of the antenna and wireless communication and channel simulation using software radio mobile; optical communication systems.

Prerequisite: Telecommunications Engineering

Textbook:

Laboratory Workbook - Telecommunication Engineering Laboratory.

ENEE606026

MICROPROCESSOR AND MICROCONTROLLER (4 CREDITS)

Learning Outcomes:

Able to implement the algorithm into a high level programming language and low level; Able to implement Microprocessors and programming addressing mode in Assembly language for Microprocessors.

Topics:

Microprocessor's Addressing Modes; Programming Assembly language for Microprocessors

Prerequisite: Basic Computer

Textbook:

1. The Intel 8086/8088 Microprocessors, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium IV Architecture, Programming, and Interfacing, Seventh Edition, Brey, Barry, b., PHI Inc., USA, 2006.
2. The 8051 Microcontroller and Embedded Systems, Second Edition, Muhammad Ali Mazidi, Prentice Hall, 2006

ENEE615028

ENEE606027

MICROPROCESSOR AND MICROCONTROLLER LAB (3 CREDITS)

Learning Outcomes:

Able to implement the algorithm into a high level programming language and low level; Capable of practicing Microprocessors and programming addressing mode in Assembly language for Microprocessor.

Topics:

Microprocessor's Addressing Modes; Programming Assembly language for Microprocessors.

Prerequisite: Microprocessor and Microcontroller

Textbook:

1. Practical module Microprocessor and Microcontroller Digital Laboratory, Department of electrical engineering.
2. Barry B. Brey, "The Microprocessors Intel 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium IV Architecture, Programming, and Interfacing," 7th Edition, PHI Inc., USA, 2006.
3. Muhammad Ali Mazidi, "The 8051 Microcontroller and Embedded Systems," Second Edition, Prentice Hall, 2006.

ENEE614023

ENEE606028

ELECTRIC MEASUREMENTS (2 CREDITS)

Learning Outcomes:

Able to explain the philosophy of electric quantity measurement; Able to calculate the threshold quantity of electricity that is safe; able to analyze a series of measurements

Topics:

Introduction of measuring instruments, the fault/error in measurement, the security and safety in Electrical Measurements, Measuring Electrical Quantities in General, measurement of Grounding Prisoners (Grounding Resistance), an Oscilloscope, a Digital gauge

Prerequisite: Electronics Circuits.

Textbook:

1. Rudy Setiabudy, " Pengukuran Besaran Listrik," LP-FEUI, 2007.
2. Klaas b. Klaassen, "Electronic Measurement and Instrumentation," Cambridge University Press, 1996.

ENEE614024

ENEE606029

ELECTRIC MEASUREMENTS LABORATORY (1 CREDITS)

Learning Outcomes:

Capable of measuring electrical quantities; Able to choose the measuring instrument to suit the needs of measurement topics:

Topics:

Gauge 1 phase, 3 phase measurement tool, the tool to measure the energy and power, grounding measuring instrument

Prerequisites:

Measurement of Electrical Quantities

Textbook:

Electric Quantity Measurement lab course modules-high-voltage Laboratory and measurement of electricity.

ENEE617037

ENEE607031

ENGINEERING ENTREPRENEURSHIP (2 CREDITS)

Learning Outcomes:

Able to implement the concepts and skills of entrepreneurship in the field of electrical engineering; Able to perform analysis and make the business plan expertise in innovation/product which corresponds to the development of information technology; Able to implement the concepts and skills of entrepreneurship in the field of electrical engineering

Topics:

Charging for Expertise, Think, Plan, Act Like an Entrepreneur, Making a Business Successful, Taking the Initiative, Enabling an E-Business, Providing Outsourced Services & Building a Contracting Business, guest lectures

Prerequisites : None

Textbook:

1. New Venture Creation - Entrepreneurship for the 21st Century, 6th Edition, J.A. Timmons and s. Spinelli, Irvin McGraw-Hill, 2004.
2. The material of the lectures given by practitioners of the entrepreneurial

ENEE611002

ENEE607032

ACADEMIC WRITING (3 CREDITS)

Learning Outcomes:

Able to write scientific papers with good structure

Being able to write down the steps with a detailed and structured research; capable of processing data with research tools statistics

Topics:

Systematics of academic writing; experimental variables and set up; statistical analysis tools, the use of the language of Indonesia is good in scientific works; English usage in scientific papers, word processing software; styling; referencing tools

Prerequisites: none

Textbook: -

MAJORING

TELECOMMUNICATIONS ENGINEERING

ENEE606301

CODING TECHNIQUE AND APPLICATIONS (3 CREDITS)

Learning Outcomes:

Capable of outlining the types of encoding; Being able to analyze the techniques used in data compression coding and reliable communications.

Topics:

Information measures, source and channel models, various source coding schemes including Huffman coding, run-length coding, linear predictive coding, transform coding, and various channel coding schemes including cyclic codes, BCH codes and convolutional codes. Trellis Coded Modulation. Application for Speech Coding, Image and Video Coding.

Prerequisite: Probability and stochastic processes

Textbook:

1. Andre Evidence, "Coding Theory: Algorithms, Architectures and Applications, Wiley-Interscience, 2007.
2. Thomas m. Cover & Joy a. Thomas, Elements of Information Theory " , Wiley-Interscience, 2006.
3. Jorge Castineira Moreira & Patric Guy keeps on, "Essentials of Error Control Coding", John Wiley & Son Pub., 2006.

ENEE615030

ENEE606302

COMMUNICATION NETWORKS (3 CREDITS)

Learning Outcomes:

Able to explain mathematical concepts with regard to the concept of communication networks; Able to explain the concept of circuit switching and packet switching as well as concepts related to communication traffic; Able to explain the concept of queuing and queue theories for communication network; Able to explain concepts and mechanisms of QoS on the network communication

Topics:

Mathematics for the network, the concept of a communication network (layering); Circuit Switched and Packet Switched, the concept of communication traffic (Erlang B, Erlang C, Engset, Bernoulli, etc.); Various theories of the queue (M/M/1, M/M/c, M/G/1, M/G/c, etc.); Markov chain concept for communication networks, QoS assurance mechanism concept and the communication network.

Prerequisite: Telecommunications Engineering.

Textbook:

1. James r. Boucher, "Traffic System Design Handbook," IEEE Press, 1993
2. Piet Van Mieghem, "Performance Analysis of Communication Networks and Systems," Cambridge University Press, 2006, USA
3. Jean Walrand, "An Introduction to Queueing Networks," Prentice-Hall Int'l, USA, 1988

ENEE606303

BROADBAND MULTIMEDIA COMMUNICATIONS (3 CREDITS)

Learning Outcomes:

Being able to analyze the concept of broadband multimedia.

Topics:

The concept of multimedia technologies, TCP/IP, network protocols, ATM, Frame Relay, MPLS, broadband wireless access technologies, metro Ethernet, NGN and IMS, QoS, Resource management, QoS, the mechanisms work and how to guarantee it, a multimedia network model, the component performance throughput capacity.

Prerequisite: Telecommunications Engineering.

Textbook:

1. Lu Guojun, "Communication and Computing for Distributed Multimedia Systems," John Wiley and Sons
2. Luis Correia, "Mobile Broadband Multimedia Networks," Elsevier, UK, 2006

ENEE607304

ANTENNAS AND PROPAGATION (3 CREDITS)

Learning Outcomes:

Able to describe wave propagation and transmission system and its implications on the performance of communication systems; Able to explain various mechanisms of propagation of electromagnetic waves; Able to explain the working principle of antenna and antenna performance parameters; Being able to describe the various types of antenna as a means for transmitting signals; Able to calculate the performance of the simple antenna systems which good in theory or application; Able to calculate the performance of a single element antenna such as a dipole, yagi, antenna loop, funnels, slot antenna and micro-strip antenna; Able to design a simple antenna and measure it; Being able to analyze the types of wave propagation and select the correct antenna for wireless communication system.

Topics:

Working principles of the basic parameters of antenna, the antenna measurement techniques,

several types of antennas: dipole antenna, monopole, antenna stacking, aperture antenna and antenna with reflector. Radio wave propagation (ground surface wave, wave, wave, space sky wave, and microwave and millimeter wave);

Prerequisite: Electromagnetics

Textbook:

1. Constantine a. Balanis, "Antenna Theory, Analysis and Design," Third Edition, John Wiley and Son, Inc., 2005.
2. Saunders r. Simon, "Antennas and Propagation for Wireless Communication Systems," First Edition, John Wiley and Son, Inc., 1999.
3. IEEE journal transaction Antenna and Propagation

ENEE607305

OPTICAL COMMUNICATIONS (3 CREDITS)

Learning Outcomes:

Able to explain wired transmission media/fiber optic as well as their principles; Able to explain the components of the optical communication system; Able to analyze optical communication systems

Topics:

Structure and optical fiber waveguide, signal degradation in on optical fiber, optical sources, optical components, optical coherent fiber communication; the techniques of modern systems; The techniques and coding theory; Performance analysis of optical communication systems

Prerequisite: Electromagnetics and Telecommunications Engineering.

Textbook:

1. Raat p. Agrawal, "Fiber-Optic Communication Systems", 3rd Edition, Wiley Interscience, 2002.
2. g. Keiser, "Optical Fiber Communications", 3rd Edition, McGraw Hill, 2000.

ENEE608308

MOBILE AND WIRELESS COMMUNICATIONS (3 CREDITS)

Learning Outcomes:

Able to explain the different types of wireless communication, concept of cellular, wireless communication components; Able to explain concepts, techniques and components of wireless mobile communication; Able to analyze performance of wireless mobile communications system.

Topics:

Overview of wireless communications, cellular concept/fundamentals, large scale fading/ path loss, small scale fading, modulation techniques, equalization, diversity, channel coding/ error control coding overview, multiple access, emerging wireless technologies: WLAN, 3G and WCDMA, 4G and LTE, mobile ad hoc networks, body area networks and mobile health, future wireless system.

Prerequisite: Telecommunications Engineering

Textbook:

1. t. s. Rappaport, "Wireless Communications: Principles and Practice", Upper Saddle River, New Jersey: Prentice Hall, 2nd ed., 2002.
2. a. Goldsmith, "Wireless Communications," Cambridge University Press, 2005.
3. w. Stallings, "Wireless Communications and Networks", Prentice Hall, 2nd ed., 2005.

ENEE616035

ENEE608307

COMMUNICATION SYSTEM DEVICES (3 CREDITS)

Learning Outcomes:

Able to analyze various subsystem communication devices; Able to analyze transmission line, ad-justment circuit, resonator, filter, amplifier, LNA, oscillator, mixer; Able to design the subsystems communication device based on active component for radio wave.

Topics:

Passive Components simple radio waves, the active component is a simple radio waves

Prerequisite: Electromagnetics, Circuit Electronics, Telecommunications Engineering.

Textbook:

1. d. m. Pozar, "Microwave Engineering", Addison-Wesley, 1998.
2. Gonzalez, "Microwave Transistor Amplifiers: Analysis and Design", 2nd Edition, Prentice Hall, 1997.

ENEE607306

SPECIAL COURSE OF TELECOMMUNICATIONS 1 (3 CREDITS)

Learning Outcomes:

Able to follow the development of the telecommunications industry and apply it; Able to follow the development of the latest telecommunications technology aspects;

Topics:

Current issues about aspects of telecommunication technology

Prerequisites: none

Textbook: no

ENEE608309

SPECIAL COURSE OF TELECOMMUNICATIONS 2 (3 CREDITS)

Learning Outcomes:

Able to follow the development of the telecommunications industry and apply it; Able to follow the latest developments in business and telecommunications regulation.

Topics:

Current issues of business and regulation of telecommunications.

Prerequisites: none

Textbook: no

MAJORING

ELECTRIC POWER ENGINEERING

ENEE606102

POWER ELECTRONICS AND LABORATORY (3 CREDITS)

Learning Outcomes:

Able to design simple application field of electric power; Able to explain the philosophy of power electronics equipment; Capable of calculating parameters on power electronics circuits; Able to design simple circuits using power electronics equipment

Topics:

Introduction to power electronics, electronic components, power converter AC-AC converter, AC-DC, DC-DC converter, DC-AC converter, power electronics applications

Prerequisite: Electric Power Engineering, Electronic Circuit

Electricity.

Textbook:

1. Muhammad h. Rashid, "Power Electronics Circuits, Devices and Applications," Prentice Hall, Fourth Edition, 2013.

2. Power Electronics lab course Modules-Electrical energy conversion Laboratory

ENEE606103

MANAGEMENT AND ENGINEERING ECONOMY (3 CREDITS)

Learning Outcomes:

Being able to classify the energy field; Able to explain the basics of business and management; Able to calculate the economics in electric field; Able to analyse the comparison of alternative technologies; Able to analyze alternative replacement; Being able to analyze the latest technology in the field of energy conversion; Able to calculate the economics source of energy; Being able to analyze the potential source of energy.

Topics:

The basic concept of management, organization type, organization resources, economic concepts, and the correlation value is money and time, comparative studies, analysis of replacement, the basics of energy management, energy costs, and calculation of potential energy

Prerequisite: none

Textbook:

1. William g. Sullivan, Elin M Wicks, James t. Luxhoj, "Engineering Economy," 3rd Edition, Pearson Education International, 2006.
2. Andrew c. Paine, John Chelsom, Lawrence v. R.P. Reavill, "Management for Engineers," John Wiley and Sons, 1996.

ENEE617038

ENEE607104

ELECTRIC POWER SYSTEM AND LABORATORY (3 CREDITS)

Learning Outcomes:

Being able to analyze the magnetic and electric field high on power system; Able to explain the philosophy of power system; Able to calculate the parameters of power network; Capable of analyzing system of electric power network; Being able to find a solution to the problem of the quality of electric power; Being able to analyze the source of disturbance in the generation, transmission, and distribution of electricity; Capable of minimizing the effects of disturbance on electric power systems.

Topics:

The phenomenon of electric field and magnetic field on the electric power system, the effects of magnetic field and electric field on electric power systems, mitigation of effects of magnetic field and electric field.

Sources of disturbance on electric power systems, the effects of disturbance on mitigation of the effects of power system disturbances in electric power systems

Prerequisite: Engineering Mathematics, Electrical Power Engineering

Textbook: B. M. Weedy, B. J. Cory, "Electric Power Systems," 4th Edition, John Wiley and Sons, 2001.

ENEE606101

ELECTRIC ENERGY CONVERSION (3 CREDITS)

Learning Outcomes:

Being able to classify the energy field; Being able to decipher the various types of energy as electric generators; Able to calculate the range of potential energy as electricity generation; Being able to analyze the process of converting electric energy;

Able to apply the principles of electrical energy conversion; Being able to analyze the latest technology in the field of energy conversion.

Topics:

Basic conversion of energy, sources of energy, new energy Conversion Technology, and renewable power plants, Thermal power plants, non-thermal power plant.

Prerequisite: Electric Power Engineering.

Textbook:

1. Djiteng Marsudi, "Pembangkitan Energi Listrik," Penerbit Erlangga, 2005.
2. Abdul Kadir, "Pembangkitan Tenaga Listrik," Penerbit UI, 1996.
3. D. Yogi Goswami, Frank Kreith, "Energy Conversion," Penerbit CRC Press, 2007.
4. Bent Sørensen, "Renewable Energy Conversion, Transmission and Storage," Penerbit Elsevier, 2007

ENEE607106

Building Electric Installation

Learning Outcomes:

Able to make the planning of the electrical installation of the building; Able to calculate the magnitudes of the electrical installation parameters on the building; Able to itemize those parts of the electrical installation of the building

Topics:

Basic electrical installation, the components of the electrical installation, the requirements of the electrical installation, electrical installation technology, security lighting, security and safety, as well as the procedures for electrical installation of buildings

Prerequisite: Electric Power Engineering

Textbook:

1. William K Y Tao R, Richard Janis, "Mechanical and Electrical System in Building," Prentice Hall, 1997.
2. Brian Scaddan, "Electrical Installation Work". Elsevier Publishing, 2005.

ENEE607105

HIGH CURRENT & VOLTAGE ENG + LAB (3 CREDITS)

Learning Outcomes:

Being able to analyze the magnetic and electric field high on power system; Able to explain the phenomenon of electric field and magnetic field is high; Capable of testing electric power equipment; Able to analyze about the occurrence of interference due to the phenomenon of the high terrain.

Topics:

The concept of a high-voltage, high-voltage test, high voltage generation, impulse generators, direct current testing and flow back and forth, testing electrical equipment

Prerequisite: Electromagnetics, Electric Power Engineering

Textbook:

1. Artono Arismunandar, "Teknik Tegangan Tinggi," Pradnya Paramita, Jakarta, Cetakan ke-7, 1994.
2. E. Kuffel, W.S. Zaengl, "High Voltage Engineering Fundamentals," Pergamon Press, 1984.
3. Modul Praktikum Teknik Arus dan Tegangan Tinggi - Laboratorium Tegangan Tinggi dan Pengukuran Listrik.

ENEE608109

ELECTRIC POWER SYSTEM PROTECTION (3 CREDITS)

Learning Outcomes:

Able to explain the philosophy of electric power system protection; Able to calculate the electrical protection system; Able to evaluate the protection system of electric power; Able to design protection system of electric power.

Topics:

Electrical protection philosophy, types of relay protection, the principle of relay protection, setup relay protection, the coordination principle of protection.

Prerequisite: Electric Power Engineering

Textbook:

1. the G.E.C. Alsthom, "Protective Relays Application Guide," U.K., 2015

ENEE608108

ELECTRIC POWER TRANS. & DISTRIBUTION (3 CREDITS)

Learning Outcomes:

Able to explain the philosophy of the distribution and transmission of electric power systems; Able to calculate the parameters of the transmission and distribution; Being able to analyze the transmission and distribution of electric power systems.

Topics:

The introduction of transmission and distribution of electrical power, the circuit of three phase motors, Inductance, Capacitance and Resistance on the transmission network, transmission network performance characteristics, the distribution Transformer, electric power distribution network.

Prerequisite: Electric Power Engineering

Textbook:

1. Luces m. Faulkenberry, Walter Coffer, "Electric Power Distribution and Transmission," Prentice Hall, 1996.
2. Iwa Garniwa, "design of electric power Distribution Equipment," Publisher - high-voltage Laboratory and measurement of electricity, Electrical Engineering Department, FTUI, 2008.
2. Iwa Garniwa, "design of Power transmission equipment," Publisher - high-voltage Laboratory and measurement of electricity, Electrical Engineering Department, FTUI, 2008.

ENEE607107

SPECIAL COURSE OF ELECTRICAL POWER 1 (2 CREDITS)

Learning Outcomes:

Able to design a simple application in the field of energy and power system.

Topics: customized to class' needs about power system technological development, and can be given by several guest lecturers

Prerequisite: Electric Power Engineering

Textbook: None

**ENEE608110
SPECIAL COURSE OF ELECTRICAL POWER 2 (2 CREDITS)**

Learning Outcomes:

Able to design a simple application in the field of energy and power system.

Topics: customized to class' needs about power system technological development, and can be given by several guest lecturers

Prerequisite: Electric Power Engineering

Textbook: None

**MAJORING
ELECTRONICS ENGINEERING**

**ENEE617040
ENEE606202
PHOTONIC DEVICES (3 CREDITS)**

Learning Outcomes:

Able to explain the working principle of passive and active photonic

Able to apply the principles of physics and mathematics to calculate the variable change device photonic

Being able to determine the independent device photonic

Able to explain passive: photonic device and optical, lattice (grating), polarization; and active photonic device: laser, LED, and photodetector

Being able to compute using Photonic device variables theory of light: the law of Snell, Fresnel equation, Fermat's law, polarization

Able to determine variables NA, attenuation, dispersion, mode sense, dispersive power, Registrar, power, free spectral range, coherence, vector and matrix Jones

Topics:

The theory of light: the law of Snell, the law of Fresnel, Maxwell's equation, Fermat's law, polarization, diffraction, NA, attenuation, dispersion, mode sense, dispersive power, Registrar, power, free spectral range, the coherency matrix, vector, Jones,

Photonic passive devices: optical, as well as lattice (grating), polarization; Active photonic device: laser diode, an LED and a photodetector.

Prerequisite: a Semiconductor Device

Textbook:

1. B.E.A. Saleh and M.C. Teich, "Fundamentals of Photonics," New York, NY: John Wiley and Sons, 1991. ISBN: 0471839655.
2. d. Griffiths, "Introduction to Quantum Mechanics," Second Edition, Upper Saddle River, NJ: Prentice Hall, 1995, ISBN: 0131118927.
3. Modul Praktikum Pilihan - Laboratorium Elektronika

**ENEE607205
VLSI (3 CREDITS)**

Learning Outcomes:

Able to design VLSI circuit

Topics:

Review of CMOS semiconductor device fabrication, the rules of design, Scale of Lambda, Asynchrony, designing logic gates, Inverter, NAND, NOR, Full custom design, Semi-custom design, validation, Packaging/IO, design for manufacturing, testing and design of fault modeling, Coding for synthesis, characteristics and Estimate the performance series, the high level design Optimization, Programmable logic arrays, subsystem Design, Properties of CMOS Logic: Area, Power, Delay, time Optimization Engine, sequential, and the structure of the regular VLSI.

Prerequisite: Electronics Circuit, semiconductor device Fabrication

Textbook:

N. Kamran Eshraghian, & Weiste "Principles of CMOS VLSI Design: A perspective", Second Edition, Addison Wesley, 2002.

ENEE606201

ADVANCED ELECTRONICS CIRCUITS (3 CREDITS)

Learning Outcomes:

Able to analyze: integrated circuits, digital circuits with bipolar digital circuits, MOSFET, power amplifier, high-order active filter, oscillator circuit, Schmidt Trigger, voltage regulators; Able to design: integrated circuits, digital circuits with bipolar digital circuits, MOSFET, power amplifier, high-order active filter, oscillator circuit, Schmidt Trigger, voltage regulators.

Topics:

Integrated circuits, digital circuits with bipolar digital circuits, MOSFET, power amplifier, high-order active filter, oscillator circuit, Schmidt Trigger, voltage regulator

Prerequisite: Electronics Circuits

Textbook:

Boylestad R, Nashhelsky L, "Electronic Devices and Circuit Theory, 9th Edition," Prentice Hall, New Jersey, USA, 2006.

ENEE616034

ENEE607204

INTRODUCTION OF NANOELECTRONICS (3 CREDITS)

Learning Outcomes:

Able to analyze recent developments in the field of electronics and photonic; Being able to analyze the workings of the Nano-electronic and Nano-photonic device.

Topics:

Nano technology and its application in the field of electronics, from the micro to the Nano, the miniaturization of electronics device, scaling the dimensions of transistor, the workings of the single electron transistors, molecular electronics work, fabrication, and characterization of Nano-devices, Nano-technology and its application in the field of photonic, the workings of the single-photon detector, the workings of the OLED

Prerequisite: A Semiconductor Device, Semiconductor Device Fabrication

Textbook:

1. Massimiliano Di Ventra, et al. Introduction to NST ch. 11 Kluwer ACAD. Publishers, 2004.
2. Vladimir v. Mitin, Viatcheslav a. Kochelap, Michael a. Stroschio, "Introduction to Nanoelectronics", Cambridge University Press, 2008

ENEE606203

SEMICONDUCTOR DEVICE FABR + LAB (3 CREDITS)

Learning Outcomes:

Able to explain the process of fabricating semiconductor devices; Capable of making a semiconductor fabrication process design on microelectronics devices; Able to use the device fabrication process design.

Topics:

The history of the semiconductor industry, semiconductor, wafer preparation and Crystal growth, contamination control, lithography, oxidation, diffusion, ion implantation, etching, deposition, application usage Supreme ver. 4.

Prerequisite: Device Electronics.

Textbook:

1. Peter Van Zant, "Microchip Fabrication," 8th Edition, International Edition, McGraw-Hill, 2004.
2. Practical semiconductor device Fabrication Module-Electronics Laboratory

ENEE608207

SOLAR CELLS (3 CREDITS)

Learning Outcomes:

Able to identify work areas devices to solar cells; Being able to compute the parameter limit efficiency, loss-power loss in a solar cell device; Being able to analyze the way of working and the solar cell performance, design and fabrication of silicon solar cells.

Topics:

The workings of the solar cell, the Parameter limit efficiency, loss-power loss in a device the

solar cell, solar cell device work area, the design of silicon solar cells, and fabrication of silicon solar cells

Prerequisite: Electronics Circuit, Semiconductor Device Fabrication

Textbook:

Marten a. Green, "Solar Cells Operating Principles, Technology and System Applications", UNSW, 1998.

ENEE608309

MEMS (3 CREDITS)

Learning Outcomes:

Able to design MEMS circuits;

Topics:

Background the development of MEMS, electronics and materials processing, MEMS and micro-electronics technology, preparation of standard silicon micromachining, bulk, and the surface of silicon micromachining, MEMS, micro stereo lithography micro-sensor, the SAW, the SAW on a solid object, the measurement parameter micro-sensor IDT, IDT micro-sensor Fabrication Micro-sensor, IDT, smart sensors and MEMS.

Prerequisite: Electronics Circuit, Semiconductor Device Fabrication

Textbook:

Julian w. Gardner, Vijay k. Varadan, and Osama o. Awadelkarim, "Microsensors, MEMS and Smart Devices," Wiley; 1 edition (December 15, 2001), ISBN-10:047186109X, ISBN-13:978-0471861096.

ENEE60730 6

SPECIAL COURSE OF ELECTRONICS 1 (2 CREDITS)

Learning Outcomes:

Being able to analyze the development of technology devices and photonic systems; Able to analyze basic photonic system for certain functions

Topics:

Current topics of development of technology devices and systems photonic

Prerequisite: Electronics Circuits

Textbook: none

ENEE607309

SPECIAL COURSE OF ELECTRONICS 2 (2 CREDITS)

Learning Outcomes:

Able to analyze recent developments in the field of electronics;

Topics:

The topics of the current technological development of electronic systems and devices

Prerequisite: Electronics Circuits

Textbook:-

MAJORING

CONTROL ENGINEERING

ENEE607405

ADAPTIVE & PREDICTIVE CONTROL SYSTEM (3 CREDITS)

Learning Outcomes:

Able to identify the model and application of predictive and Adaptive; Capable of analyzing discrete control system, the stability of non-linear system using Lyapunov method; Capable of designing discrete adaptive and predictive control; Able to evaluate the performance of predictive and adaptive control systems.

Topics:

The basic concept of predictive and adaptive control, recursive parameter estimation, method of pole placement method, minimum variance, dynamic matrix control, model algorithmic control, generalized predictive control, predictive control room situation.

Prerequisite: Control Engineering

Textbook:

1. P.E. Wellstead and M.B. Zarrop, "Self-tuning Systems: Control and Signal Processing", John Wiley and Sons, 1991.
2. J.M. Maciejowski, "Predictive control with constraints", Prentice Hall, 2000

ENEE615029**ENEE606401****DIGITAL CONTROL SYSTEM (3 CREDITS)**

Learning Outcomes:

Capable of analyzing discrete control system; Able to explain the characteristics of discrete systems; Capable of analyzing the stability of discrete systems; Able to design a simple discrete controller; Able to make discrete controller design method: root locus, and pole placement; Able to make the design of state observer of discrete Full order observer, and Reduced order observer

Topics:

The basic concept of a digital control system, a review of z-transforms, discrete time transfer functions, methods of realization of discrete control system, Transient and steady state response, analysis of stability of discrete systems, discrete root locus method, design the root locus method control discrete, discrete state space models, canonical forms, discrete state space model analysis (Eigen values, controllability, observability), pole-placement method of discrete, observer design of discrete.

Prerequisite: Control Engineering

Textbook:

Ogata, k. "Discrete Time Control Systems", Prentice Hall, 2002.

ENEE617039**ENEE606402****PROCESS CONTROL SYSTEM (3 CREDITS)**

Learning Outcomes:

Able to identify the model of dynamical systems of industrial processes; Able to explain measurement techniques of dynamical systems of industrial processes; Able to explain the characteristics of industrial processes; Able to describe systems of industrial processes; Able to identify industrial process modeling method

Topics:

Process and characteristics of the problem, the process of measurement methods, sensors and transmitters, signal conditioning and installation, industrial process modeling, PID controllers, tuning PID control, cascade control, feedforward control, smith predictor, a variation on another controller.

Prerequisite: Control Engineering

Textbook:

1. Curtis d. Johnson, "Process Control and Instrumentations", 8th Edition, Prentice Hall Inc. 2005.

2. Carlos a. Smith and Armando Corripio, b. "Principles and Practice of Automatic Process Control", 3rd Edition, John Wiley & Sons, Inc. 2005.

ENEE607404**ROBOTICS (3 CREDITS)**

Learning Outcomes:

Able to identify the needs of the components of Robotics; Being able to analyze the kinematics of the robot; Able to evaluate the drive systems Robotics; Integrated control system capable of designing on simple robotics systems; Able to design kinematics robotics.

Topics:

Robotics Automation system components (sensors, actuators, controllers), the principle of work of system of robotics, kinematics of robots, robotics control systems (position control) robot kinematics-based interconnection system components, robotics, engineering the design of robots, robot programming, simulation with OpenGL, the introduction of a high level of robots.

Prerequisite: Engineering control, algorithms and programming.

Textbook:

1. Robotics: design, control, and artificial intelligence, Andi Publisher by Endra Pitowarno, 2006.

2. Introduction to Robotics: mechanics and control, 3rd Edition, John Craig, Pearson, 2009.

**ENEE606403
ELECTRIC DRIVE CONTROL SYSTEM (3 CREDITS)**

Learning Outcomes:

Being able to analyze the component controller and electric drive system components; Able to evaluate the performance of the electric drive system with simulation; Able to evaluate simple motor drive systems.

Topics:

Electric drive systems, modeling of electric motors (DC, PMSM, IM), power transfer circuit (PWM 3 phase inverter), the servo motor DC brushless speed controller, and position, the concept of reference frame, vector control, simulation of electric drive system.

Prerequisite: Engineering Control.

Textbook:

1. Peter vase, "Electrical Machines and Drives: A Space-Vector Theory Approach", Oxford University Press, UK, 1993.
2. Peter vase, "Sensor-less Vector and Direct Torque Control", Oxford University Press, 1998.

**ENEE608407
MECHATRONICS (3 CREDITS)**

Learning Outcomes:

Being able to analyze the components of the controller; Capable of analyzing the limitations of Mechatronics system components; integrated control system capable of designing in Mechatronics system is simple; capable of designing system of Mechatronics Robotics with applications to accommodate the limitations of the components.

Topics:

Introduction to Mechatronics systems, characteristics and limitations of Mechatronics system Method of improvement reliability of Mechatronics system components, Mechatronics system design, electromechanical system modeling, design and development of application software, control compliant, tele-robotic, bilateral control.

Prerequisite: Robotics

Textbook:

Robert Bishop, "Mechatronics and Introduction", 2006.

**ENEE608408
KNOWLEDGE BASED SYSTEMS (3 CREDITS)**

Learning Outcomes:

Able to identify the model of knowledge-based dynamical systems; Being able to analyze the performance of artificial neural network; Able to implement algorithms in programming language for knowledge-based systems.

Topics:

the working system of neurons, cells, artificial neural network architecture (JST); the learning method is JST; back propagation neural networks (BPNN); algorithms and analysis of programming error, function of BPNN in Matlab; optimization of parameters; application of BPNN program as the system identifier of the pattern, the system control based neural network: an analysis of the use of methods of control, as a system of BPNN identification of neural network-based systems: representation of data and the use of BPNN as identification system, program development system identification using the BPNN full-based system, the development of BPNN and analysis theory and its application, program development system control using the BPNN full system integration based BPNN.

Prerequisite: control Engineering, Algorithms and programming

Textbook:

1. Lefteri h. Tsoukalas, and Robert e. Uhrig, "Fuzzy and Neural Approaches in Engineering", John Wiley & Sons, Inc., Singapore, 1997.
2. John Yen and Reza Langari, "Fuzzy Logic, Intelligence, Control and Information", Prentice Hall, Inc. New Jersey, 1999.

**ENEE607406
SPECIAL TOPIC OF CONTROL ENGINEERING 1 (2 CREDITS)**

Learning Outcomes:

Able to follow the development of the control technology and its implementation; Able to follow

the development of current aspects of control technology.

Topics:

Current issues about control technological aspects

Prerequisites: none

Textbook: none

ENEE608409

SPECIAL TOPIC OF CONTROL ENGINEERING 2 (2 CREDITS)

Learning Outcomes:

Able to follow the development of the control technology and its implementation; Able to follow the latest development of the control technology business.

Topics:

Current issues about control business technology.

Prerequisites: none

Textbook: none

MAJORING

BIOMEDICAL ENGINEERING

ENEE606502

MEDICAL COMMUNICATION SYSTEM (3 CREDITS)

Learning Outcomes:

-Able to explain some of the technology of communication system for medical applications

-Able to explain the system of e-healthcare and telemedicine

-Able to explain the process of designing the system wired/wireless medical communication

Able to make the design through simulation design of medical devices

Topics:

Introduction to medical communication system, e-healthcare and telemedicine. Several special course will be delivered include body-centric wireless communications, electromagnetic properties and modeling of the human body, portable wearable devices, medical implant communication systems, e-healthcare infrastructure, wireless body area network, mobile-based telemedicine system, and wireless power technology in medical devices.

Communication systems on and off, in the body and how to model the via simulation

Prerequisites: none

Textbook:

1. E-Healthcare Systems and Wireless Communications: Current and Future Challenges, Mohamed k. Watfa, Publisher: IGI Global.
2. Antennas and Propagation for Wireless Communications Centric Body, P. Hall, Publisher: Artech House, 2006.

ENEE607504

MEDICAL IMAGING TECHNOLOGY (3 CREDITS)

Learning Objective:

After getting the courses the student is expected to:

1. Able to understand some basic concepts in medical imaging technology
2. Able to explain and analyze the basic method of medical image processing in reconstructing, improving the quality of the image, making the image segmentation, image analysis, visualization of image data, and manage medical imagery in order to support the process of imaging/ medical imaging in the field of health

Able to apply the methods in environmental biology and basic science to medical applications system

Able to integrate circuit and electronic device to device/instrument of biomedicine

Able to make simulations of imaging methods in medical devices

Being able to make a report of the results of the simulation of a small project

Being able to analyze the signals in the medical system to process the signal with the signal processing technique of medical

Topics:

Introduction to Medical Imaging Technologies (x-ray and Ultrasound, MRI, CT, PET and SPECT, Electrical Impedance Tomography), Image formation and Reconstruction (Acquisition, Digitiza-

tion, Image Reconstruction Methods), Image Enhancement (Fundamentals of enhancement techniques, Image enhancement with linear, nonlinear, adaptive, and fixed, pixel-based methods), Image Segmentation and Analysis (Fundamentals of Medical Image Segmentation, Image acquisition and preprocessing artefacts, Thresholding, Edge-based techniques, Region-based segmentation, Classification, Morphological Methods for Biomedical Image Analysis), Image Visualization (2-dimensional visualization, 3-dimensional visualization methods: surface rendering, volume rendering, Algorithm for 3-d visualization), Image Management (Fundamentals of Compression Standards, Storage and Communication, Image archive and retrieval, three-dimensional compression).

Medical image processing, artifact acquisition, thresholding, Edge-based techniques, Region-based segmentation, Classification,

The methods of image formation process and its analysis

Image formation, medical imaging tools

Formation of the image of medical signals and image analysis, visualization

Prerequisites: None.

Textbook:

1. Handbook of Medical Imaging: Processing and Analysis Management, Isaac Bankman, Academic Press 2000, CA, USA.
2. Handbook of Medical Imaging, vol. 2: Medical Image Processing and Analysis, M. Sonka & J.M. Fitzpatrick, SPIE Press, 2009, Washington, USA.

ENEE606501

BIOLOGY AND ANATOMY (3 CREDITS)

Learning Objective:

Give the basic knowledge of the mechanisms of biology and anatomy of engineering.

Instructional Objectives:

- a. Able to explain the basic concepts of cell biology, molecular, biochemical and genetic engineering
- b. Have the knowledge about the essential components and the various functions of the system of molecular cell.
- c. Have the knowledge of the techniques and approaches that are commonly used in molecular biology of the cell.
- d. Apply the knowledge of biology to biomedical engineering and health sciences.

Able to explain the phenomenon in the medical field with the approach to biology and anatomy of human organs

Able to make reports papers

Able to explain the phenomenon in the medical world with the approach to biology and anatomy of human organs

Topics: constituent molecules of the cell, structure and function of proteins within the cell, metabolism, changes in the cells; Molecular design of biochemical constituents of life, and the genetic revolution, DNA, linkages with biodiversity, biochemical protein synthesis of nucleic acids into a sequence of amino acids-RNA polymerase 2, until the Ribosome for protein synthesis, eukaryotic and prokaryotic differences; Catalytic reactions in cells: nucleoside monophosphate kinases, proteases; Mechanical chemical in cells: how protein motors to convert chemical energy into mechanical work.

Understanding human anatomy, Cytology and Histology, Osteology, Arthrologi, Miologi, digestive system, respiratory system, circulatory system.

Constituent molecules of the cells and organs of human body Anatomy

Prerequisites: None

Textbook:

1. Alberts, 2003, Molecular Biology of the cell.
2. Lodish, Molecular cell biology, 2004.
3. G.W. Jenkins, C.P. Kemnitz, G.J. Tortora, Anatomy and Physiology: From Science to Life, John Wiley & Sons: 2nd Ed. 2010.

MEDICAL SYSTEM MODELLING (3 CREDITS)

Learning Outcomes:

Learning Objective:

Understand the components of the medical system, understand the mathematical model of the medical system, understand the modeling method of the medical system, Able to perform simple modelling medical systems and able to simulate.

Able to apply the algorithm for a device/instrument of biomedicine

Able to report the results of the coding program

Topic: Introduction to signal and system of medical models, mathematical modeling and signal system in General, analytic modeling of medical system, analysis of analytical models, methods of identification of the medical system, the method of parameter estimation model, the simulation model of the medical system.

Analytic modeling of medical system

Analysis of analytical models, methods of identification of the medical system, the method of parameter estimation model, the simulation model of the medical system.

Prerequisites: None.

Textbook:

1. David T. Westwick, Robert E. Kearney, "Identification of Nonlinear Physiological Systems," John Wiley & Sons, 2003.

2. Willem van Meurs, "Modeling and Simulation in Biomedical Engineering: Applications in Cardiorespiratory Physiology," 1st ed., McGraw-Hill Education, 2011

ENEE608508

MEDICAL INFORMATICS (3 CREDITS)

Learning Objective:

After getting the courses the student is expected to:

1. Able to understand the basic concepts of information technology to be applied in the field of health

2. Able to apply the basic methods of Informatics with the use of basic knowledge of programming to acquire, organize, combine, and analyze health data sources

Able to apply the algorithm for a device/instrument of biomedical engineering

Able to apply the basic principles in biology in the concept of medical technology

Able to explain the basic biomedical engineering

Able to apply concepts of basic science into principles in biomedicine

Topic: Introduction to Medical Informatics, Controlled Medical Terminology, The Electronic Health Record (EHR), Health Information Systems in Clinical Settings, Health Information Systems in Public Health, Informatics Issues in Virtual Healthcare, Telemedicine, and Expert Systems, Medical Informatics and Clinical Decision Making, Future Technologies, Fundamental Algorithms & Methods of Medical Informatics, Medical Data Resources: Acquisition, Processing, and Classification.

Introduction to medical informatics and its method

Algorithms and methods of medical informatics

Prerequisites: None.

Textbook:

1. Biomedical Informatics: Computer Applications in Health Care and Biomedicine (Health Informatics) 4th ed., 2014 Edition.

2. Method in Medical Informatics: Fundamentals of Healthcare Programming in Perl, Python, and Ruby, Jules Berman, CRC Press.

ENEE606503

INTRODUCTION TO BIOMEDICAL TECHNOLOGIES (3 CREDITS)

Learning Objective:

After completion of the following courses, students are able to:

1. Understand biomedical technology systems

2. Explain the concept of system engineering applications to the problems of human biology

3. Illustrate the concept of detection, measurement, and monitoring of human physiological signal
4. Explain the concept of the diagnosis interpretations through the techniques of signal processing bioelectric data
5. Explain the concept device-device for therapy and rehabilitation
6. Make computer data analysis based on data from patients in the framework of decision making in clinical
7. Explain the concept of device for artificial organs
8. Reviewing the concept of medical imaging techniques

Able to apply the basic principles in biology in the concept of medical technology

Able to explain the basic biomedical engineering

Able to apply concepts of basic science into principles in biomedical engineering

Topics: Physiologic Systems, Bioelectric Phenomena, Introduction to Biomechanics & Biomaterials, Introduction to Biomedical Sensors, Biomedical Signal Analysis, Introduction to Medical Imaging, Medical Instruments and Devices.

Prerequisites: None.

Textbook:

1. The Biomedical Engineering Handbook, D.R. & Bronzino J.D. Peterson, 4th ed., CRC Press, 2000.
2. Standard Handbook of Biomedical Engineering and Design, M. Kutz, McGraw-Hill, 2003.
3. Handbook of Biomedical Engineering, J. Kline, Academic Press, 1988.

ENEE608507

BIOMEDICAL INSTRUMENTATIONS + LAB (3 CREDITS)

Learning Outcome:

After following this course, students are able to:

1. Understand the biomedical measurement system
2. Understand and apply various kinds of cardiovascular system measurement
3. Understand and apply various kinds of respiration system measurement
4. Understand and apply various kinds of nervous system
5. Understand patient safety factors that must be considered in the measurement

Able to apply the basic principles in biology in the concept of medical technology

Able to explain the basic engineering science biomedicine

Able to apply concepts of basic science into the principles of biomedical engineering

Able to operate medical equipment

Able to integrate circuit and electronic device to device/instrument of biomedicine

Able to make the design through simulation design of medical devices

Topic: Introduction to biomedical instrumentation; Basic transducer principle (active and passive transducer, the transducer for biomedical application; the source of bioelectric potentials; electrodes; the cardiovascular system; cardiovascular measurement; measurement in respiratory system; non invasive diagnostic instrumentation; measurement in nervous system; sensory and behavioural measurements; electrical safety of medical equipment; role of laser in healthcare.

Prerequisites: None.

Textbook:

1. Biomedical Instrumentation and Measurement, Leslie Cromwell, Fred J. Weibel and Erich A. Pleiffer, Prentice Hall, New Jersey.
2. Handbook of Biomedical Instrumentation, RS Khanpur, Tata McGraw-Hill Education, 2003.

ENEE608509

SPECIAL COURSE OF BIOMEDICAL 1 (3 CREDITS)

Learning Outcome:

This course provides an understanding of physical principles on the biological mechanisms and process (movement, design, structure, materials and transport).

At the end of the study, students are expected to:

- Apply biomechanical principles to resolve problems in human movement and musculoskeletal such as ergonomic, rehabilitation and training.

- Use of the effective and safe biomechanics instrumentation and equipment for the acquisition/assessing human movement.
- Understand the trend of future problems of biomechanics.

Able to explain the phenomenon in the medical with the approach of biology and anatomy human organs

Topics:

Newton's laws, fluid mechanics: Bernoulli, Drag forces, Reynold number, Mechanics of static systems and moving system, Kinetics and force on the body as well as the influence on the movement and stability, Basic mathematic in motion/movement, analysis and instrumentation on the motion of the body, the basic concept of human body bones muscle mechanics, Ergometry, The basic concept of energy.

Prerequisites: None.

Textbook:

1. N. Ozkaya, and M. Nordin, "Fundamentals of Biomechanics: Equilibrium, Motion and Deformation", 2nd ed., Springer, 1998.
2. E. Okuno, and L. Fratin, "Biomechanics of the Human Body", Springer, 2013.

ENEE618102

SOFTWARE ENGINEERING (3 CREDITS)

Learning Outcomes: In this course, students will learn how to design software with correct steps and able to document them. After following this course, students will able to design software using the stage of the software life cycle with the desired risk level, capable of making design software with the correct stages; capable of documenting the stages of design software

Topics: Hardware and software processes; Requirements analysis and elicitation; System specifications; System architectural design and evaluation; Concurrent hardware and software design; System integration, Software testing and validation; Maintainability, manufacturability, sustainability

Prerequisite: Algorithm and Programming

Textbook:

1. Ian Sommerville, Software Engineering, 10th ed., Pearson, April 3, 2015
2. Robert c. Martin, Agile Software Development, Principles, Patterns, and Practices, Pearson, 2002

ENEE617101

OBJECT ORIENTED PROGRAMMING + LAB (3 CREDITS)

Learning Outcomes: In this lecture, students will study how to create program with object-oriented concepts. After following this course, students are able to implement a software design into object-oriented programming language; able to establish the concept of object-oriented programming (class, constructor, scope of variables); able to outline the Basic objects (arrays, array list, object collection, iterator); able to describe the concept of design class (coupling, cohesion, refactoring, inheritance, polymorph, substitution); able to implement a GUI-based programming, exception handling and multithreading.

Topics: Java Language Elements; Java Language Operation; Defining and Using Class; System, Strings, String Buffer, Math & Wrapper Classes; Array; Classes & Inheritance; Design Graphical User Interface & Event Driven; Exceptions; Collections; Threads and Javadoc

Prerequisite: Algorithm and Programming

Textbook:

1. David j. Barnes, "Objects First with Java: A Practical Introduction Using BlueJ", 5th ed., Pearson, 2011
2. Bart Baesens URet.al., "Beginning Java Programming: The Object-Oriented Approach", Wrox, 2015

SPECIAL COURSES

ENEE616032

ENEE606023

INTERNSHIP (2 CREDITS)

Learning Outcome:

Able to apply technical knowledge that has been acquired during the study; Able to demonstrate

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work professionalism, work in teams, discipline, responsibility, initiative & interest, leadership, and attitude/behaviour; Able to present the results of the internship in the internship's defense.

Topic: None.

Prerequisite:

Have passed the 90 CREDITS. Internship place are industrial or lab associated with electrical engineering on the condition there is a supervisor in the internship place. The selection of the internship place is started with the administrative process through the Department of electrical engineering.

Textbook: None.

ENEE617036

ENEE607030

SEMINAR (2 CREDITS)

Learning Outcome:

Able to propose system, component, and process of the research; Able to write research proposal; Able to present the research proposals.

Syllabus: Introduction; Literature studies; Research design.

Prerequisite: Passed the 90 CREDITS.

Textbook:

1. Technical guidelines on the writing of Thesis students of the University of Indonesia.
2. IEEE Citation Reference.
3. Ivan Stojmenovic, "How to Write Research Articles in Computing and Engineering Disciplines," IEEE Transactions on Parallel and Distributed Systems, vol. 21, no. 2, February 2010.

ENEE618041

ENEE608033

BACHELOR THESIS (4 CREDITS)

Learning Outcome:

Able to make the design of the system, component, and process; Able to carry out the research plan; Able to analyze the research results; Able to convey the results of the study in the bachelor thesis defense.

Topic: Design and implementation of experimental research; Data analysis; Conclusions.

Prerequisite: Passed 120 CREDITS

Textbook:

1. Technical guidelines on the writing of bachelor thesis of the Universitas Indonesia.
2. IEEE Citation Reference.
3. Ivan Stojmenovic, "How to Write Research Articles in Computing and Engineering Disciplines," IEEE Transactions on Parallel and Distributed Systems, vol. 21, no. 2, February 2010.

4.6. UNDERGRADUATE PROGRAM IN COMPUTER ENGINEERING

Program Specification

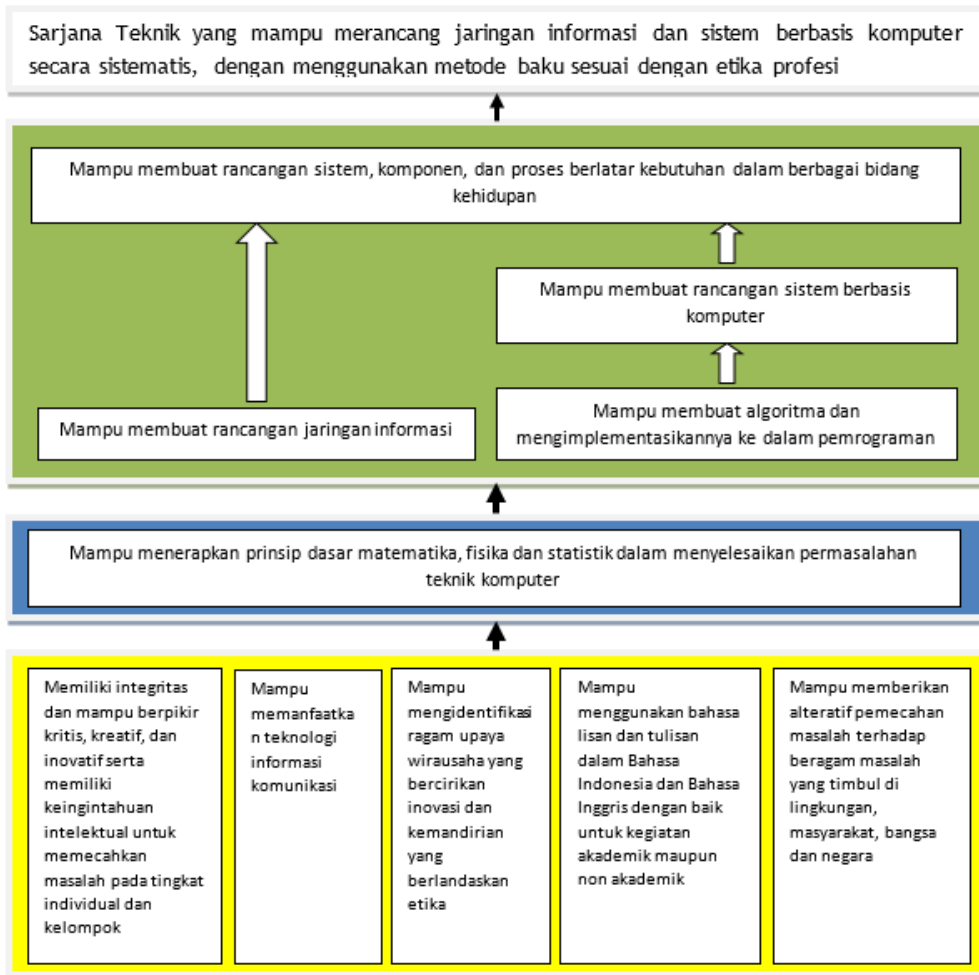
1.	Awarding Institution	Universitas Indonesia	
2.	Teaching Institution	Universitas Indonesia	
3.	Programme Tittle	Undergraduate Program in Computer Engineering	
4.	Class	Regular	
5.	Final Award	Sarjana Teknik (S.T)	
6.	Accreditation / Recognition	BAN-PT: B - accredited AUN-QA	
7.	Language(s) of Instruction	Bahasa Indonesia and English	
8.	Study Scheme (Full Time / Part Time)	Full Time	
9.	Entry Requirements	High school /equivalent AND pass the entrance exam.	
10.	Study Duration	Designed for 4 years	
	Type of Semester	Number of Semester	Number of weeks / semester
	Regular	8	17
	Short (optional)	3	8
11.	Graduate Profiles: Bachelor of Engineering who is able to design information network and computer based system systematically using standard method in accordance with professional ethics.		
12.	<p>Expected Learning Outcomes:</p> <ol style="list-style-type: none"> 1. Able to design system, component, and process based on needs in a variety of areas of life. 2. Able to design information networks. 3. Able to design a computer-based system. 4. Able to make algorithm and implement it into programming. 5. Able to apply the basic principles of mathematics, physics, and statistics in solving computer engineering. 6. Able to use the language both spoken and written in the Bahasa Indonesia and English for academic or non-academic activities. 7. Have integrity and are capable of critical thinking, creative, and innovative and have the intellectual curiosity to solve problems at the level of the individual and the group. 8. Able to utilize information technology communication. 9. Able to provide alternative solutions to problems that arise in the environment, society, nation, and country. 10. Able to identify varieties of entrepreneurial efforts that are characterized by innovation and self-reliance based on ethics. 		
13	Classification of Subjects		
No.	Classification	Credit Hours (SKS)	Percentage
i	University General Subjects	18	12,50%
ii	Basic Engineering Subjects	16	11,11%
iii	Basic Electrical Engineering Subject	17	11,80%
iv	Core subject	76	52,78%
v	Elective Subject	9	6,25%
vi	Special Subject (Internship, Seminar, Undergraduate Thesis)	8	5.56%
	Total	144	100 %
14.	Total Credit Hours to Graduate		144 SKS

Career Prospects

The program graduates are needed in almost all fields of work, e.g. industry, services, banking and all fields requiring the application IT (Information technology).

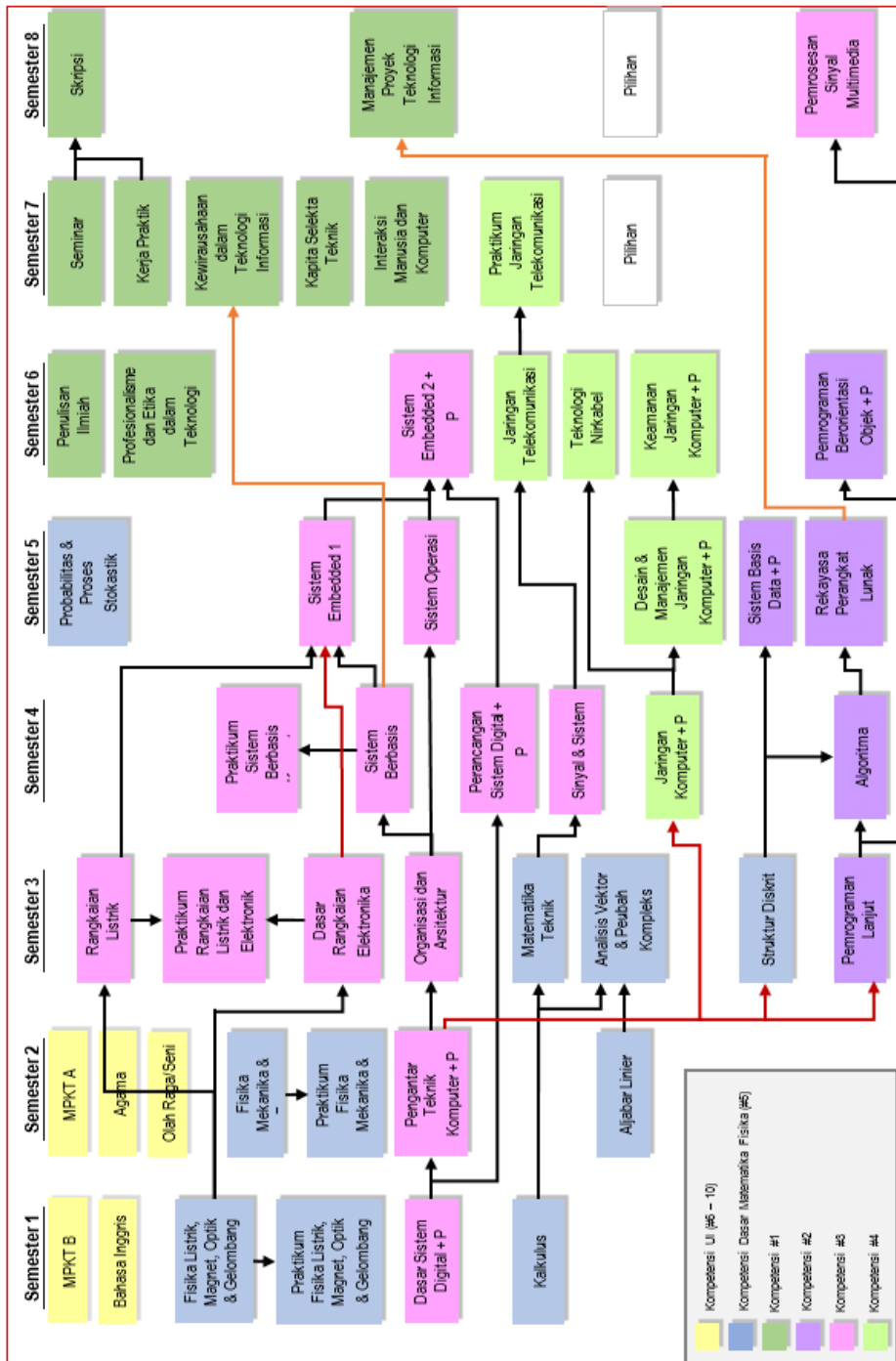
Some professional profiles that are suited to this program's graduate are IT Manager, Project Manager, Program Manager, Programmer, System Analyst, Software Developer, Data Analyst, Product Specialist, Software Engineer, Computer Hardware Engineer, System Administrator, IT Support, etc.

Learning Outcomes



Keterangan:

- Profil Lulusan
- Kompetensi UI
- Kompetensi FT
- Kompetensi TekKom UI



CURRICULUM STRUCTURE COMPUTER ENGINEERING

KODE	MATA KULIAH	SUBJECT	SKS
Semester 1		1st Semester	
UIGE600002	MPKT B	Integrated Character Building B	6
ENGE600007	Fisika Listrik, MGO	Physics (Electricity, MWO)	3
ENGE600008	Prak. Fisika Listrik, MGO	Physics (Electricity, MWO) Lab	1
ENGE600003	Kalkulus	Calculus	4
ENCE601001	Dasar Sistem Digital + P	Fund. of Digital System + Lab	3
UIGE600003	Bahasa Inggris	English	3
		Sub Total	20
Semester 2		2nd Semester	
UIGE600001	MPKT A	Integrated Character Building A	6
UIGE600010 - UIGE600015	Agama	Religion	2
UIGE600020 - UIGE600048	Olah Raga/Seni	Sports/Arts	1
ENGE600002	Aljabar Linier	Linear Algebra	4
ENGE600005	Fisika Mekanika dan Panas	Physics (Mechanics and Thermal)	3
ENGE600006	Prak. Fisika Mekanika dan Panas	Physics (Mechanics and Thermal) Lab	1
ENCE602002	Pengantar Teknik Komputer + P	Intro to Computer Engineering + Lab	3
		Sub Total	20
Semester 3		3rd Semester	
ENCE603003	Matematika Teknik	Engineering Mathematics	4
ENCE603004	Dasar Rangkaian Elektronika	Basics of Electronic Circuits	2
ENCE603005	Rangkaian Listrik	Electric Circuit	2
ENCE603006	Prakt Rangkaian Listrik & Elektronik	Electric & Electronic Circuits Lab	1
ENCE603008	Organisasi dan Arsitektur Komputer	Computer Organization & Architecture	3
ENCE603009	Struktur Diskrit	Discrete Structures	3
ENCE603010	Analisis Vektor dan Peubah Kompleks	Vector Analysis Complex Variables	2
ENCE603012	Pemrograman Lanjut	Advanced Programming	3
		Sub Total	20
Semester 4		4th Semester	
ENCE604011	Sinyal dan Sistem	Signal and Systems	3
ENCE604013	Perancangan Sistem Digital + P	Digital System Design + Lab	3
ENCE604014	Sistem Berbasis Komputer	Computer Based Systems	4
ENCE604015	Praktikum Sistem Berbasis Komputer	Computer Based Systems Laboratory	1
ENCE604016	Jaringan Komputer dan Praktikum	Computer Networks and Laboratory	4
ENCE603007	Algoritma	Algorithm	3
		Sub Total	18
Semester 5		5th Semester	
ENCE605017	Probabilitas dan Proses Stokastik	Probability and Stochastic Process	3
ENCE605018	Rekayasa Perangkat Lunak	Software Engineering	3

ENCE605019	Sistem Embedded 1	Embedded System 1	2
ENCE605020	Sistem Operasi	Operating Systems	3
ENCE605021	Desain & Manajemen Jaringan Komputer + P	Design & Management Computer Networks + Lab	4
ENCE605022	Sistem Basis Data dan Praktikum	Database Systems and Laboratory	3
		Sub Total	18
	Semester 6	6th Semester	
ENCE607031	Penulisan Ilmiah	Academic Writing	2
ENCE606024	Jaringan Telekomunikasi	Telecommunication Networks	3
ENCE606025	Keamanan Jaringan Komputer + P	Computer Networks Security + Lab	3
ENCE606026	Sistem Embedded 2 + Lab	Embedded Systems 2 + Lab	3
ENCE606027	Profesionalisme & Etika dalam TI	Professionalism and Ethics in IT	2
ENCE606028	Pemrograman Berorientasi Objek + P	Object Oriented Programming + Lab	3
ENCE606029	Teknologi Nirkabel	Wireless Technology	2
		Sub Total	18
	Semester 7	7th Semester	
ENCE607030	Seminar	Seminar	2
ENCE606023	Kerja Praktik	Internship	2
ENCE607032	Kewirausahaan dalam Teknologi Informasi	Entrepreneurship in Information Technology	2
ENCE607033	Kapita Selekt Teknik Komputer	Capita Selecta in Computer Engineering	2
ENCE607034	Praktikum Jaringan Telekomunikasi	Telecommunication Networks Lab	1
ENCE607035	Interaksi Manusia dan Komputer	Human Computer Interaction	2
	Pilihan	Electives	6
		Sub Total	17
	Semester 8	8th Semester	
ENCE608036	Skripsi	Bachelor Thesis	4
ENCE608037	Manajemen Proyek Teknologi Informasi	Project Management in IT	3
ENCE608038	Pemrosesan Sinyal Multimedia	Multimedia Signal Processing	3
	Pilihan	Electives	3
		Sub Total	13
		Total	144

ELECTIVES COMPUTER ENGINEERING

KODE	MATA KULIAH	SUBJECT	SKS
	Semester Ganjil	Odd Semester	
ENCE607101	Dasar Regulasi dan Kebijakan Publik TIK	Regulation & Public Policy on ICT Sector	3
ENCE607102	Rekayasa dan Analisis Data	Data Analysis Engineering	3
	Semester Genap	Even Semester	
ENCE608103	Perancangan VLSI	VLSI Design	2
ENCE608104	Teknologi Big Data	Big Data Technology	3

Syllabus of courses in Computer Engineering according to the structure of the curriculum:

UIGE600002

MPKT B

6 CREDITS

See The Engineering Syllabus

ENGE600007

Physics (Electricity, MWO)

3 CREDITS

See The Engineering Syllabus

ENGE600008

PHYSICS (ELECTRICITY, MWO) LAB

1 CREDITS

See The Engineering Syllabus

ENGE600003

CALCULUS

4 CREDITS

See The Engineering Syllabus

ENGE601001

FUND. OF DIGITAL SYSTEM + LAB

3 CREDITS

Learning Outcomes: In this course, students will learn all design phases and implementations of a digital system. At the end of the course, students will be able to analyze simple digital circuits, and able to design digital systems using combinational and simple sequential building blocks. This lecture also involves several practical work in the laboratory to design, implement and verify digital logic systems using digital circuit simulation software.

Topics: Boolean Algebra Principles and applications; Interface Logic Families; Number System & Data Encoding; Basic Logic Circuits; Basic Modular Design of Combinational Circuits; Basic Modular Design of Sequential Circuits.

Practical work: Module 1-Introduction and introduction to Digital Circuit Basics, Module 2 - Boolean Algebra and Elementary logic gates, Module 3 - Karnaugh Map, Module 4 - complex logic gate, Module 5 - Decoder and Encoder, Module 6 - Multiplexer and De-multiplexer, Module 7- Digital Arithmetic Circuit, Module 8 - Flip-Flop and Latch, Module 9-Registers and Counters, Module 10 - Group Project

Prerequisite: none.

Textbook:

1. M. Morris Mano, r. Charles r. Kime, Tom Martin, Logic & Computer Design Fundamentals, 5th ed., Prentice Hall, 2000
2. Ronald j. Tocci, Neal s. Widmer, and Gregory l. Moss, Digital Systems: Principles and Applications, 11th ed., Prentice Hall, 2010
3. Basics of Digital System Lab. Practice Modules

UIGE600003

ENGLISH

3 CREDITS

See The Engineering Syllabus

UIGE600001

MPKT A

6 CREDITS

See The Engineering Syllabus

UIGE600010 - UIGE600015

RELIGION
2 CREDITS
See The Engineering Syllabus

UIGE600020 - UIGE600048
SPORTS/ARTS
1 CREDITS
See The Engineering Syllabus

ENGE600002
LINEAR ALGEBRA
4 CREDITS
See The Engineering Syllabus

ENGE600005
PHYSICS (MECHANICS AND THERMAL)
3 CREDITS
See The Engineering Syllabus

ENGE600006
PHYSICS (MECHANICS AND THERMAL) LAB
1 CREDITS
See The Engineering Syllabus

ENCE602002
INTRO TO COMPUTER ENGINEERING + LAB
3 CREDITS

Learning Outcomes : This course is the introduction to the computer engineering world. This lecture discusses topics that are the basics required in computer engineering. At the end of the course students will be able to explain the components of a computer system both hardware and software, able to design simple algorithms in pseudocode and able to implement them into programs by using a particular programming language.

Syllabus : The introduction of Computers, introduction to computer hardware, introduction to Computer Software, algorithm, Pseudocode, introduction to C language, control structures in C language, structured Program in C language.

Practical work: Module 1 - Introduction, Module 2- computer hardware, Module 3- computer software, Module 4- Flowchart, Module 5 - Pseudocode, Module 6- Introduction to Programming in C language, Module 7- Branching in C Language, Module 8- Looping in C language, Module 9-Project in C Language.

Prerequisite: Basic Digital System

Textbook:

1. Alan Evans, Kendall Martins, Mary Anne Poatsy, Technology in Action, Complete, 11th Edition, Pearson, 2015
2. Deitel & Deitel, "C How to Program," 5th Edition, Pearson Education, 2007.

ENCE603003
ENGINEERING MATHEMATICS
4 CREDITS
See Electrical Engineering Syllabus

ENCE603004
BASICS OF ELECTRONICS CIRCUITS
2 CREDITS

Learning Outcomes: In this course students will learn the basic electronics components as well as its circuitry. At the end of this course, students will be able to describe the properties of materials and the operation of a basic electronics component, such as a diode, tran-

sistors, op-amps, filters etc.

Topics: Electronics Materials, diodes, bipolar transistors and; MOS transistor circuit, timing, and power; Storage cell Architecture; Operational Amplifiers

Prerequisite: Physics Electricity, Magnetism, Optics and waves

Textbook:

1. Robert Boylestad Louis Nashelsky, & “Electronic Devices And Circuit Theory”, Ninth Edition, Prentice Hall, Upper Saddle River, New Jersey, Columbus, Ohio, 2006.

ENCE603005

ELECTRIC CIRCUIT

2 CREDITS

Learning Outcomes : In this course, students will learn the basic electrical circuits. At the end of this course, students will be able to analyze simple electronic and electrical circuits using appropriate techniques, analyze the resistive circuits, their AC and DC properties as the basics of electrical engineering.

Topics: Introduction, resistive circuits, the dependent sources and op. amps, analysis methods, energy - storage elements, first - order circuits, second - order circuits, phasors, sources and sinusoidal AC steady state analysis, air conditioning - steady - state power.

Prerequisites : Physics electricity, magnetism, Optics and waves

Textbook:

1. D . E. Johnson, J. R. Johnson, et.all. , “Electric Circuit Analysis”, 3rd Edition, Prentice Hall International, Inc., 1997, (Chapters 1-9).
2. J . D. Nilsson, S. A. Riedel, “Electric Circuits”, 10th Edition, Prentice Hall International, Inc., 2002.

ENCE603006

ELECTRIC AND ELECTRONIC CIRCUITS LAB

1 CREDITS

Learning Outcomes: In this course students will learn the practical skills in handling components and basic electronic and electric circuit. At the end of this lab practice, students will be able to analyze the operation of electric and electronics circuit using simple techniques.

Topics: Module 1-Introduction; Module 2-Diode; Module 3-BJT Amplifiers; Module 4-FET Amplifier; Module 5-Op-Amp Amplifier; Module 6-Filter; Module 7-basic Electricity; Module 8-Mesh and Node analysis of Linearity; Module 9-Thevenin and Norton Superposition Analysis;

Prerequisite: Physics electricity, magnetism, Optics and waves, Electrical Circuits, basic Electronics Circuits

Textbook:

1. Robert Boylestad Louis Nashelsky, & “Electronic Devices And Circuit Theory”, Ninth Edition, Prentice Hall, Upper Saddle River, New Jersey, Columbus, Ohio, 2006.
2. D . E. Johnson, J. R. Johnson, URet.all. , “Electric Circuit Analysis”, 3rd Edition, Prentice Hall International, Inc., 1997, (Chapters 1-9).
3. J . D. Nilsson, S. A. Riedel, “Electric Circuits”, 10th Edition, Prentice Hall International, Inc., 202.
4. Module electrical and electronic Circuit Teaching

ENCE603007

ALGORITHM

3 CREDITS

Learning Outcomes: In this course students learn how to evaluate the algorithm. After following this course, the student will be able to explain the basis of the analysis of algorithms; able to explain classic algorithms; able to evaluate algorithm by its complexity

Topics: The basic of algorithms analysis; The algorithm strategy; Classical algorithms for common taCREDITS; Analysis and design of algorithms for specific application; Parallel algorithms and multi-threading; Algorithm complexity

Prerequisite: Advanced Programming

Textbook:

1. Gilles Brassard, Paul Bratley, "Algorithms: Theory and Practice", Prentice Hall Professional Technical Reference, 1988
2. Thomas H. Cormen, "Introduction to Algorithms", 3rd Edition, MIT Press, 2009
3. Robert Sedgewick & Kevin Wayne, "Algorithms", 4th ed., Addison-Wesley Professional, 2011

ENCE600008

**COMPUTER ORGANIZATION & ARCHITECTURE
3 CREDITS**

Learning Outcomes: In this course, the architecture and the organization of computer system is discussed. After following this course, the student will be able to distinguish the meanings of computer organization and architecture computer, capable of analyzing the computer architecture, particularly the design of instruction-set, the correlation between clock-speed and CPU performance and the influence of the structure of the bus for computing speed, was able to decipher the role of cache memory to improve memory access time, including its organization and updates mechanism. Student will also be able to develop small programs using the basic instruction set of hypothetical processor. Students will also be able to elaborate on the influence of the programming techniques for computational speed. Students will also be able to analyze advanced processor design in improving performance computing like pipelining, parallel processors and multicore processors.

Topics: The basic Instruction set architecture; Organization Of The Processor; Memory; Peripheral subsystems; Multi-many core architectures; Pipelining

Prerequisite: Intro to Computer Engineering + Lab

Textbook:

1. W . Stallings, "Computer Organization and Architecture", 9 th Edition, Pearson International , 2012
2. Petterson and Hennesy, "Computer Organization and Design" 5th edition, Morgan Kaufman, 2013

ENCE603009

**DISCRETE STRUCTURES
3 CREDITS**

Learning Outcomes: In this course students will learn the basic principles of discrete mathematics and apply it to examine and study the modern computing techniques and build a foundation for analyzing problems in computer engineering and developing solutions. After following this course, the student will be able to create sets and functions, applying the techniques of proof, as well as being able to use the theory of graph, tree, iteration and recursion in various cases of problems in the field of computer engineering

Topics: set; relation; function; Boolean algebra; proofing techniques; basic proof; graph; tree; iteration; recursion

Prerequisite: none

Textbook:

1. Kenneth h. Rosen, "Discrete Mathematics and Its Applications", 7th Edition , McGraw-Hill Science/Engineering/Math; 2011
2. Richard Johnsonbaugh, "Discrete Mathematics", 7th Edition, Pearson Intl. Edition, Prentice-Hall, NJ, 2009

ENCE603010

**COMPLEX VARIABLES AND VECTOR ANALYSIS
2 CREDITS**

See Electrical Engineering Syllabus

ENCE604011

**SIGNAL AND SYSTEMS
3 CREDITS**

See Electrical Engineering Syllabus

ENCE604012

ADVANCED PROGRAMMING

3 CREDITS

Learning Outcomes : In this course will be on learn regarding programming using high-level languages. After following this course the student is expected to be able to implement modular programming in the form of a function (by value and by reference); being able to implement recursion algorithm into the C language; capable of using arrays in C program; able to make programs with data structures; able to make programs with dynamic data structures.

Topics: Programming constructs and paradigms: pointer, Array, linked list; Problem-solving strategies: searching, sorting; Data structures; Recursion

Prerequisite: Introduction to computer engineering and Practical

Textbook:

1. Deitel & Deitel, "C How to Program", 7 th Edition, Pearson International Edition 2012.

ENCE604013

DIGITAL SYSTEM DESIGN + LAB

3 CREDITS

Learning Outcomes: In this course, it will discussed the principles in designing digital systems. After following this course, the student is expected to be able to design and analyze sequential and combinational circuit using a hardware modeling language definition language (HDL) and able to do synthesis into the PLD, CPLD and FPGA-like.

Topics: Modular Design of Combinational Circuits; Modular Design of Sequential Circuits; Control and Data-path design; design with programmable logic; system design constraints; fault models & testing

Prerequisite: Fund. of Digital System + Lab

Textbook:

1. Charles h. Roth, Jr., Lizy K John, Digital Systems Design Using VHDL, 2007
2. Bryan mealy, Fabrizio Tappero, Free Range VHDL, freerangefactory.org
3. Digital System Design Lab Modules

ENCE604014

COMPUTER BASED SYSTEMS

4 CREDITS

Learning Outcomes: In this course, it will be discussed about microprocessor and microcontroller technology. After following this course, the student is expected to be able to do the process interface to the I/O equipments; able to make simple programs in Assembly language for embedded systems; capable of designing embedded systems with a simple microcontroller

Topics: Introduction to computer systems, addressing modes, data transfer, programming microprocessor with Assembly language, memory interface, introduction of computer-based systems, programming Input/Output, interrupt handling, timer

Prerequisite: Computer Organization & Architecture

Textbook:

1. Brey, Barry B, The Intel 8086/8088 Microprocessors: 80186/80188, 80286, 80386, 80486, Pentium Pro, Pentium, Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit Extensions, 8th ed., PHI Inc., USA, 2011.
2. The 8051 Microcontroller and Embedded Systems, Second Edition, Muhammad Ali Mazidi, Prentice Hall, 2006
3. Joseph Yiu, "The Definitive Guide to the ARM Cortex-M0", Academic Press, 2011

ENCE604015

COMPUTER BASED SYSTEMS LABORATORY

1 CREDITS

Learning Outcomes: In this subject, students will conduct hands-on programming the microprocessor and microcontroller-based embedded systems, as well as interfacing microcontroller. After following this lab course students are expected to be able to conduct inter-

facing to the i/o tools, able to make simple programs in Assembly language for embedded systems and capable of designing embedded systems with a simple microcontroller 8051 and ARM

Topics: Module 1-Introduction to Practical Microprocessors & microcontroller, module 2-Programming the microprocessor with Assembly language, module 3 - Program Control Instruction Modules, module 4-Procedure and Macro, module 5-Project Microprocessor, Module-6 Microcontroller Programming with Assembly language, Module 7 - Subroutines, Module 8- Input/Output, Module 9-Introduction to Microcontroller Programming with C language, Module 10 -Microcontroller Project

Prerequisite: Computer Based Systems

Textbook:

1. Lab Module System of Computer-Based Digital Laboratory, Department of Electrical Engineering
2. Brey, Barry B, The Intel 8086/8088 Microprocessors: 80186/80188, 80286, 80386, 80486, Pentium Pro, Pentium, Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit Extensions, 8th ed., PHI Inc., USA, 2011.
3. The 8051 Microcontroller and Embedded Systems, Second Edition, Muhammad Ali Mazidi, Prentice Hall, 2006
4. Joseph Yiu, "The Definitive Guide to the ARM Cortex-M0", Academic Press, 2011

ENCE604016

COMPUTER NETWORKS AND LABORATORY

4 CREDITS

Learning Outcomes: In this course, students study the topics about computer networks comprehensively from layer 1 to layer 7. After following this course, the student will be able to implement the various Protocol TCP/IP and Ethernet network technology as well as the right addressing in a simple network, able to implement simple network-based VLAN and applying various routing protocols such as static routing, RIP, Single Area OSPF and make use of Access Control lists, DHCP and NAT to support networking capabilities, and is able to implement basic access control features in computer networks and are able to utilize the concept of dynamic addressing and implementing network address translation in simple computer network

Topics: architecture and network topology, Protocol and communications networks; OSI and TCP/IP Layer; technology access network on the LAN and WAN; Ethernet technology; network layer; IP Address & Subnetting; transport network and application protocol; Basic switched networks; VLAN & InterVAN; The concept of routing static & dynamic; Routing Protocol RIP; Single Area OSPF; Access Control List Standard & Extended; DHCP Server & Client, Relay, Static & Dynamic NAT

Prerequisite: Intro to Computer Engineering + Lab

Textbook:

1. A. Tanenbaum, "Computer Networks", Prentice Hall, 5th Eds, 2010
2. CISCO Networking Academy Program: Network Fundamentals, CCNA Exploration 4 ver, <http://cisco.netacad.net>

ENCE605017

PROBABILITY AND STOCHASTIC PROCESSES

3 CREDITS

See Electrical Engineering Syllabus

ENCE605018

SOFTWARE ENGINEERING

3 CREDITS

Learning Outcomes: In this course, students will learn how to design software with correct steps and able to document them. After following this course, students will able to design software using the stage of the software life cycle with the desired risk level, capable of making design software with the correct stages; capable of documenting the stages of design software

136 Topics: Hardware and software processes; Requirements analysis and elicitation; System

specifications; System architectural design and evaluation; Concurrent hardware and software design; System integration, Software testing and validation; Maintainability, manufacturability, sustainability

Pr asyarat : Advanced Programming

Textbook:

1. Ian Sommerville, Software Engineering, 10th ed., Pearson, April 3, 2015
2. Robert c. Martin, Agile Software Development, Principles, Patterns, and Practices, Pearson, 2002

ENCE605019

EMBEDDED SYSTEMS 1

2 CREDITS

Learning Outcomes: In this course, students learn to make embedded systems design (hardware and software) for specific applications. After following this course, students will be able to design embedded systems with sensors and actuators in synchronous and asynchronous system.

Topics: Characteristics of embedded systems; Asynchronous and synchronous serial communication; Data acquisition, control, sensors, actuators

Prerequisite: Computer-Based Systems, Electric Circuits, Basics of Electronics Circuits

Textbook:

1. Lee & Seshia , “ Introduction to Embedded Systems-A Cyber-Physical Systems Approach “ , 2nd edition, UC-Berkeley , 2015

ENCE605020

OPERATING SYSTEM

3 CREDITS

Learning Outcomes: In this subject, it will be discussed the basic principles of early generation and up-to-date operating system. After following this course, the student will be able to explain the system resource management of computer systems, able to explain the memory management techniques; able to explain the techniques of data storage management; able to explain the techniques of management of computer resources; able to explain the architecture of distributed systems

Topics: Operating Systems Structures; Process; Thread; CPU Scheduling; Concurrency; Memory-system management, storage management; distributed system architectures

Prerequisite: Computer Organization & Architecture

Textbook:

1. Abraham Silberschatz, “Operating System Concepts “ , 9th ed., Dec. 21, 2012
2. Andrew s. Tanenbaum, Modern Operating Systems “” “”, Pearson, Mar. 20, 2014

ENCE60 5021

DESIGN & MANAGEMENT COMPUTER NETWORKS + LAB

4 CREDITS

Learning Outcomes: On this subject it will be studied how to design a network with a larger scale taking into account aspects of scalability and reliability. After following this course the student will be able to implement the various techniques of redundancy and LAN Link Aggregation to increase scalability and reliability of the network, being able to use the Routing Protocol EIGRP and OSPF in the scale of a larger network, as well as capable of designing a network WAN and Internet as well as applying the principles of network management and procedures

Topics: Network Scalability; LAN redundancy; Link Aggregation; Wireless LAN; Multi-area OSPF Multi-access and; EIGRP. Hierarchical Network Design; WAN technologies; Point to Point connection and Frame Relay; Broadband Solutions; Internet VPN; Network Monitoring; Troubleshooting the networks; Network performance evaluation. Project: The design of computer network in an organization of a company.

Prerequisite: Computer Network + P

Textbook:

1. CISCO Networking Academy Program: Network Fundamentals, CCNA Exploration 4

ver, <http://cisco.netacad.net>

2. James d. McCabe, “network analysis, architecture and design”, 3 nd Edition, Morgan Kaufmann, 2007.

ENCE60 5022

DATABASE SYSTEMS AND LABORATORY

3 CREDITS

Learning Outcomes: In this course, students will learn the concepts of database systems and applications. After following this course, the student is able to design a structured database in the software design and implement it into a SQL database system

Topics: Database systems; Event-driven and concurrent programming; Using application programming interfaces

Prerequisite: Discrete Structures

Textbook:

1. Ramez Elmasri, Shamkant b. Navathe, Fundamentals of Database Systems, 7th ed., Pearson, June 18, 2015
2. Avi Silberschatz et al., “Database System Concepts”, 6th Edition, McGraw-Hill, 2009.

ENCE607031

ACADEMIC WRITING

2 CREDITS

Learning Outcomes: In this course students will learn how to create a proposal and scientific papers for publication. After following this course the student will be able to write scientific papers with a good structure, able to use the Bahasa Indonesia and English in scientific writing, and being able to use the software to write scientific papers with a good format.

Topics: Systematics of scientific writing; experimental variables and sets up; statistical analysis tools; The use of the Bahasa Indonesia in scientific works; The use of English languages in scientific works; Word processing software; styling; referencing tools

Prerequisite: none

Textbook:

1. Ranjit Kumar, Research Methodology: A Step by Step Guide for Beginners, 3rd ed. Sage Publication, 2012
2. Robert a. Day and Barbara Gastel, How to Write and Publish a Scientific Paper, 6th ed. Greenwood Press, London, 2006

ENEE606024

TELECOMMUNICATION NETWORKS

3 CREDITS

Learning Outcomes: This courses discusses the telecommunications network system. After following this course, the students will able to explain the principles and basic methods of Telecommunication Engineering as well as the use of telecommunication devices in the network system, capable of outlining the techniques of modulation and multiplexing; able to explain the functions of telecommunications devices in the network system

Topics: Introduction to Telecommunication Networks; Modulation (Amplitude and frequency); Digital Modulation; Multiplexing Techniques; Coding; Telephony Systems; Technology of Telecommunications Devicec

Prerequisite: Signals and systems

Textbook:

1. S. Haykin, “Communication Systems”, 5th Edition, John Wiley & Sons, Inc., 2008.
2. R.L. Freeman, “Telecommunication Systems Engineering”, 4th Edition, John Wiley & Sons, Inc., 2004.

ENCE606025

COMPUTER NETWORKS SECURITY + LAB

3 CREDITS

Learning Outcomes: In this subject, student will study security techniques in computer

networks. After following this course, students are able to analyze and implement security aspects on the network computer, capable of analyzing the security and integrity of your data and perform protection, able to apply the techniques of cryptography and authentication in network security and web.

Topics: Security and integrity of Data; Vulnerabilities; Resource Protection; Private & Public Key Cryptography; Authentication; Network and Web Security.

Prerequisite: Design and management of computer networks + Lab

Textbook:

1. W. Stallings, "Network Security Essentials: Applications and Standards, 5/E, Prentice Hall, 1995.
2. R.R. Panko, Corporate Computer and Network Security, Prentice-Hall, 2004
3. M.E. Whitman and Henry Julian Mattord, Principles of Information Security, Thomson Course, 2003

ENCE606026

EMBEDDED SYSTEMS 2 + LAB

3 CREDITS

Learning Outcomes: In this course, students learn to optimize resources in embedded systems that include the CPU, memory and other resources. After following this course, the student will be able to make advanced embedded systems design with attention to efficient power, and for mobile and networking purposes

Topics: Periodic interrupts, waveform generation, time measurement; Implementation strategies for complex embedded systems; Techniques for low-power operation; Mobile and networked embedded systems.

Prerequisite: Embedded Systems 1, Operating Systems, Digital System Design + Lab

Textbook:

1. Sam Siewer & John Pratt, real-time Embedded Components and Systems with Linux and RTOS, 2nd ed., Mercury Learning, 2015

ENCE606027

PROFESSIONALISM AND ETHICS IN IT

2 CREDITS

Learning Outcomes: In this course, students will learn the concept of professionalism and ethics in the field of information technology. After following this course, the student is able to describe the current issues in the code of conduct IT; able to elaborate on professional ethics, the role of professional organizations against its members; able to explain the current job classification in the field of IT and professional certification IT field; capable of outlining the importance of the code of ethics of the profession and its impact on the wider community; able to explain the social responsibility in the field of IT; able to apply the concepts of professionalism and ethics in certain cases

Topics: Ethics; Job, profession and professional; Profession in information technology; Organization and code of Ethics of IT experts; cyber ethics; intellectual copyright; Internet crime

Prerequisite: none

Book Reference:

1. ACM Code of Ethics and Professional Conduct, <https://www.acm.org/about-acm/acm-code-of-ethics-and-professional-conduct>
2. Tavani, Herman t., "Ethics & Technology: Ethical Issues in an Age of Information and Communication Technology", John Wiley & Sons, 2004

ENCE606028

OBJECT ORIENTED PROGRAMMING + LAB

3 CREDITS

Learning Outcomes: In this lecture, students will study how to create program with object-oriented concepts. After following this course, students are able to implement a software design into object-oriented programming language; able to establish the concept of object-oriented programming (class, constructor, scope of variables); able to outline the Basic objects (arrays, array list, object collection, iterator); able to describe the concept of design

class (coupling, cohesion, refactoring, inheritance, polymorph, substitution); able to implement a GUI-based programming, exception handling and multithreading.

Topics: Java Language Elements; Java Language Operation; Defining and Using Class; System, Strings, String Buffer, Math & Wrapper Classes; Array; Classes & Inheritance; Design Graphical User Interface & Event Driven; Exceptions; Collections; Threads and Javadoc

Prerequisite: Advanced Programming

Textbook:

1. David j. Barnes, "Objects First with Java: A Practical Introduction Using BlueJ", 5th ed., Pearson, 2011
2. Bart Baesens URet.al., "Beginning Java Programming: The Object-Oriented Approach", Wrox, 2015

ENCE606029

WIRELESS TECHNOLOGY

3 CREDITS

Learning Outcomes: In this course, students learn the basics of wireless technologies including how it works, techniques, and standardizing on wireless network and mobile. After following this course, the participant is able to explain the basics of wireless technology, techniques in wireless network technology, the standard IEEE 802.11, 802.15 and capable of analyzing projections of future wireless technologies.

Topics: The technology 802.11 (Wireless LAN); Technology 802.15 (Bluetooth, Zigbee, WPAN)

Prerequisite: Computer Networks + Lab

Textbook:

1. Eldad Perahia, "Next Generation Wireless LANs: 802.11n and 802.11 air conditioning", 2nd Edition, Cambridge University Press; 2nd edition, June 24, 2013
2. Al Petrick, "IEEE 802.11 Handbook: A designer's Companion," 2nd Edition, IEEE Standards Information Network, 2005

ENCE607030

SEMINAR

2 CREDITS

Learning Outcomes: In this subject, students learn how to make bachelor thesis proposal to design system, component, and process in the field of embedded systems or computer networks within the research framework

Topics: Introduction and research background; literature studies; research design

Prerequisite: already passed 120 CREDITS

Textbook:

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ENEE606023

INTERNSHIP

2 CREDITS

Learning Outcomes : In this subject, students will learn how to work in a company. After following this subject, the student will be able to participate significantly in the team to complete the work related to the field of ICT. In this course, the student is required to be able to be active for working with the team. Students will also be able to deliver the results of his/her work in the internship report seminar.

Topics: Practical work in the company

Prerequisite: already passed 90 CREDITS

Textbook:

-

ENCE607032

ENTREPRENEURSHIP IN INFORMATION TECHNOLOGY

2 CREDITS

Learning Outcomes: In this course students learn the basic concepts of project management and marketing specialized in the field of information technology. After following this course

the students are able to implement the concepts and skills of entrepreneurship in innovation of information technology in the form of a business plan expertise in innovation/product which corresponds to the development of information technology.

Topics: Charging for Expertise, Think, Plan, Act Like an Entrepreneur, Making a Business Successful, Taking the Initiative, Enabling an E-Business, Providing Outsourced Services & Building a Contracting Business, guest lectures

Prerequisite: Computer-Based Systems

Textbook:

1. Bill Aulet, *Disciplined Entrepreneurship: 24 Steps to a Successful Startup*, Wiley, Aug 12.2013

ENCE607033

CAPITA SELECTA IN COMPUTER ENGINEERING

2 CREDITS

Learning Outcomes: In this course, students will learn about the current topics in computer engineering industry. After following this course the students are able to analyze the development of the industry in the field of computer engineering and the problems faced in General.

Topics: The concept of the latest computer technology; Latest computer technology applications; Tradeoff in the new technology of computer science; The latest issues in computer engineering

Prerequisite: none

Textbook: to be determined later

ENCE607034

TELECOMMUNICATION NETWORKS LAB

1 CREDITS

Learning Outcomes : This course aims to provide experience to students in doing experiments that analyze and demonstrate the concepts of Telecommunication Engineering. After completing this course, students are able to explain the techniques of modulation and multiplexing; able to describe the workings of all components of telecommunications devices in the network system

Topics: Introduction to telecommunication networks, Amplitude Modulation, frequency modulation, Telephony Systems, PCM and TDM, Digital Modulation, Line Coding, Digital Filters FIR

Prerequisite: Telecommunications Network

Textbook:

1. Telecommunications Engineering Teaching Modules - Laboratory of Telecommunications.
2. S. Haykin, "Communication Systems", 5th Edition, John Wiley & Sons, Inc., 2008.
3. R.L. Freeman, "Telecommunication Systems Engineering", 4th Edition, John Wiley & Sons, Inc., 2004.

ENCE607035

HUMAN COMPUTER INTERACTION

2 CREDITS

Learning Outcomes: In this course, students learn and apply HCI theory and analytical approach in producing a prototype of human and computer interaction that is high quality, effective, and efficient. After following this course, the student will be able to design and analyse an interface of computer-based systems.

Topics: factors in HCI; input and output devices; interaction; interaction design; HCI in software process; design rules; implementation support; evaluation techniques; universal design

Prerequisite: none

Textbook:

1. A.J. Dix, J.E. Finlay, G.D. Abowd and Beale, r. "Human-Computer Interaction", Third Edition, Prentice Hall, USA, 2003.
2. B. Shneiderman and Plaisant, C. "Designing The User Interface: Strategies for Effective Human Interaction", Fifth Edition, Pearson Addison-Weasley, 2010.

ENCE608036
BACHELOR THESIS
3 CREDITS

Learning Outcomes: In this special course, students will learn to examine and engage in a research team. After following this course, students will be able to design systems, components, and processes in the field of embedded systems or computer networks within the framework of research. Students will be able to carry out the planned research, be able to analyze the results of the study, able to convey the results of the research in thesis defense.

Topics: Design and implementation of experimental research; Data analysis; Conclusion

Prerequisite: Seminar

Textbook:

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ENCE608037
PROJECT MANAGEMENT IN IT
3 CREDITS

Learning Outcomes: In this subject, students will discuss the managerial principle in IT projects. After following this course, students are expected to be able to apply project management, including team management, scheduling, project management, information management, and design of the project plan

Topics: Project management principles; Risk, safety, dependability and fault tolerance; IT Project Collaboration strategies; Relevant tools, standards and/or engineering constraints

Prerequisite: Software Engineering

Textbook:

1. K. Schwalbe, "Information Technology Project Management", 7th Edition, Course Technology, 2013.
2. W. S Humphrey, "Introduction to the Team Software Process, Addison Wesley, 2000.

ENCE608036
MULTIMEDIA SIGNAL PROCESSING
3 SKS

Learning Outcomes: In this course students will learn multimedia signal processing technology to support the delivery of multimedia information through the Internet. At the end of this course, the student will be able to perform analysis of multimedia signals in the network using appropriate techniques. Students will be able to describe components in multimedia files, multimedia compression techniques, are able to perform analysis and processing of multimedia data such as image, sound and video. Students will also be able to apply a digital image processing algorithms to analyze the information in it.

Topic: Introduction to Multimedia network, Coding and compression of Multimedia Signals (images, sounds, video), improvement the quality of an image, image processing, image Segmentation, representation and description, object recognition

Prerequisite: Advanced Programming

Textbook:

1. J.N. Hwang, Multimedia Networking: From Theory to Practice, Cambridge University Press, 2009.
2. R.C. Gonzalez and R.E. Woods, Digital Image Processing, 3rd Edition, Prentice-Hall, 2007.
3. R.C. Gonzalez, R.E. Woods, and S. L. Eddins, Digital Image Processing Using MATLAB, 2nd Edition, Gatesmark Publishing, 2009.

ELECTIVES OFFERED IN COMPUTER ENGINEERING STUDY PROGRAM:

ENCE607101
VLSI DESIGN
2 SKS

Learning Outcomes: At the end of this course, student will be able to describe the stages of

the CMOS design process, implement the Scale of Lambda design, evaluate the characteristics and performance of the power transistor circuit and CMOS digital , as well as the explain the optimization of high level design techniques.

Topics: Mixed-signal circuits; Design parameters issues; Circuit modelling & Simulation methods

Prerequisite: Fund. of Digital System + P

Textbook:

1. N.E. Weste and k. Eslughian, "Principle of CMOS VLSI Design", Addison-Wesley, 1985.
2. F.M. Berti, "Analog Design for CMOS VLSI System", Kluwer Academic Publishers, 2006.

ENCE60 71 0 2

DATA ANALYSIS ENGINEERING

3 CREDITS

Learning Outcomes: In this course the student is directed to implement the data analysis algorithm into the program. At the end of this course the student will be able to use mathematical and statistical techniques commonly used in basic pattern recognition. Students will be able to use some of the techniques common learning algorithm either supervised or unsupervised in conducting pattern recognition, classification and clustering.

Topics: An introduction to pattern recognition, artificial neural networks, the back-propagation algorithm, unsupervised learning, Principal Component Analysis

Prerequisite: Complex Variables and Vector Analysis, probability & process Stochastic Programming, Advanced

Textbook:

1. Christopher M. Bishop, " Pattern Recognition and Machine Learning

ENCE608103

BIG DATA TECHNOLOGY

3 CREDITS

Learning Outcomes: In this course students will learn the technology that can be used in utilizing big data to solve different fields (for example: internet, telecommunications, retail).

At the end of this course, students will be able to manage (collection, preparation, processing, validation, interpretation) and analyze large amounts of structured and random data.

Topics: Introduction to Data Engineering, Hadoop Architecture, The Hadoop Distributed File system, Setting Up Hadoop clusters, administering Hadoop, Map Reduce Framework, developing a Database Application, Hive Map Reduce, Spark Processing, Big Data Analytic Project

Prerequisite: Data Base System

Textbook:

1. Jure Leskovec, Anand Rajaraman, Jeff Ullman, Mining of Massive Datasets, Cambridge University Press, 2001
2. Tom White, "Hadoop: The Definition Guide", Third Edition, the O'Reilly, 2012

ENCE60 81 0 4

REGULATION & PUBLIC POLICY on ICT SECTOR

3 CREDITS

Learning Outcomes: In this course students will be exposed on the basics of drafting process and the development of regulatory and public policies, especially in the era of vast development in information and communication technology (ICT). At the end of this course, the student will be able to explain the basics of public policy, law and regulation in telecommunication industry, and Internet governance. This course will also provide examples of applicable regulation and policy in the field of telecommunications and the Internet, to anticipate the pace of change and the community dynamics implied by the development of ICT.

Topics: Public administration, public policy significance, range of research methods and policy research, comparative studies, introduction to law and policy regulation in telecommunications, economic analysis of telecommunications regulation, key issues of telecommunication regulation, understanding internet governance, the internet governance stake-

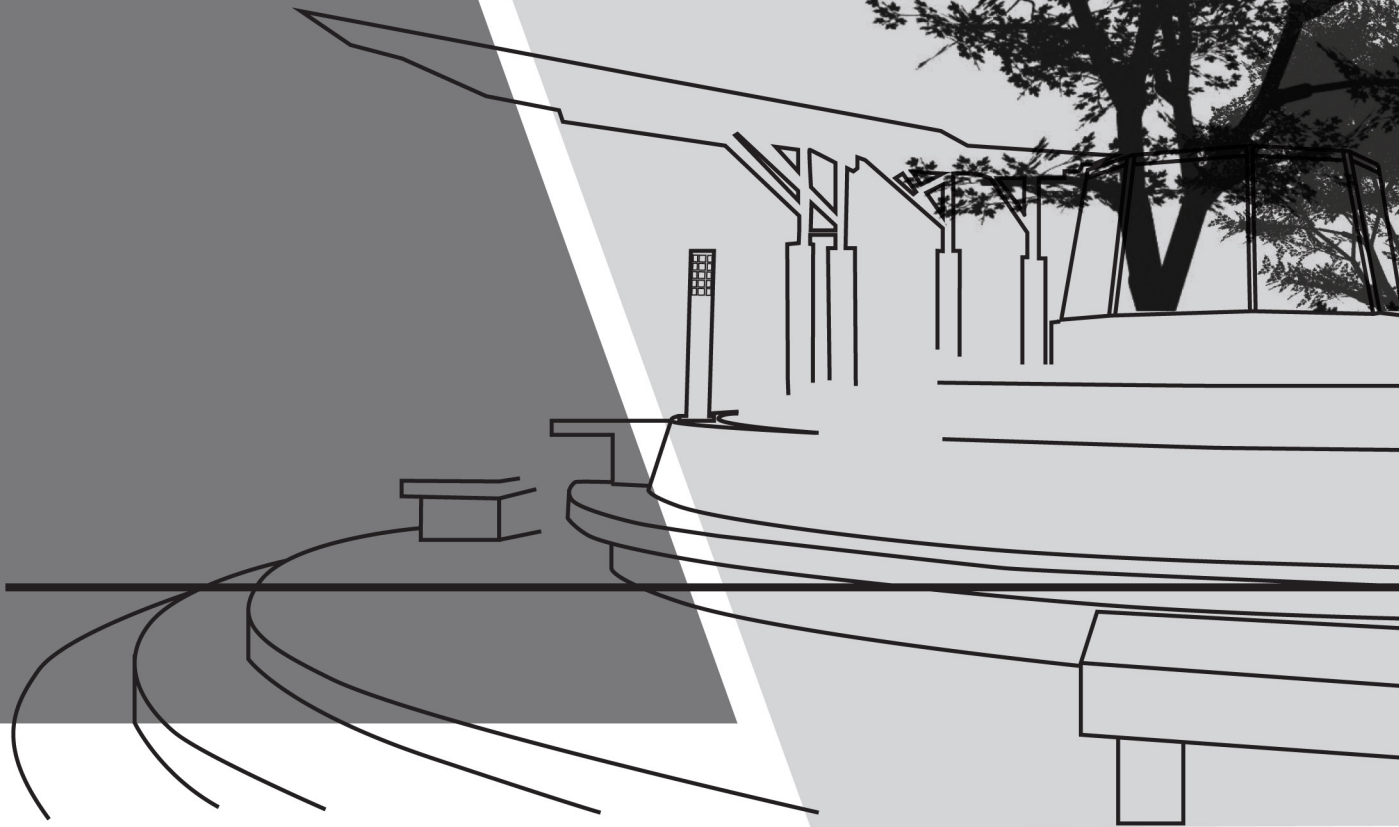
holder, the internet governance process

Prerequisite: -

Textbook:

1. Ian Walden, "Telecommunications Law and Regulation", Oxford University Press, 2011
2. Jovan Kurbalija, "about Internet governance: an introduction", JIHAD, 2011
3. Riant Nugroho, "Public Policy: the dynamics of policy, Policy Analysis, policy management", Elex Media Komputindo, 2012

MASTER
PROGRAM



5.3. MASTER PROGRAM IN ELECTRICAL ENGINEERING

Program Specification

1	Awarding Institution	Universitas Indonesia	
2	Teaching Institution	Universitas Indonesia	
3	Programme Title	Master Program in Electrical Engineering	
4	Class	Regular	
5	Final Award	Magister Teknik (M.T.)	
6	Accreditation / Recognition	BAN-PT: A - accredited	
7	Language(s) of Instruction	Bahasa Indonesia	
8	Study Scheme (Full Time / Part Time)	Full Time	
9	Entry Requirements	Pass the entrance exam, and pass s1/d iv from electrical engineering study program, mechanical engineering, computer science, informatic engineering, mathematic, physics, and equivalent program	
10	Study Duration	Designed for 2 years	
	Type of Semester	Number of semester	Number of weeks /semester
	Regular	4	16
	Short (optional)	1	8
11	Graduate Profiles:	Magister of engineering who is able to formulate solution to complex problems in the field of electrical engineering trough advancement technology based research using inter and multydiscipline approach in accordance with professional ethics.	
12	Expected learning outcomes:	<p>General outcomes:</p> <ol style="list-style-type: none"> 1. Able to model electrical engineering system into mathematical equations 2. Able to formulate the problem solving in electrical engineering with the proper research methods 3. Able to produce innovative independent scientific work 4. Able to apply concepts of professional management in the field of electrical engineering <p>Majoring in electronics and photonics:</p> <ul style="list-style-type: none"> • Able to design advanced electronics and photonics devices • Able to design photonics system • Able to study state of the art of technology in the field of electronics and photonics. <p>Majoring in communication engineering</p> <ul style="list-style-type: none"> • Able to evaluate the performance of system and telecommunication network • Able to design communication system and radar system • Able to design communication system and radar system equipments • Able to recommend the latest technology in the field of telecommunications and radar <p>Majoring in control engineering</p> <ul style="list-style-type: none"> • Able to evaluate control system performance • Able to recommend the latest control methode based on the system need • Able to desing the latest control in the real systems • Able to study the latest research in fielf of control engineering <p>Majoring in electrical power engineering and energy:</p> <ul style="list-style-type: none"> • Able to specify technical and non-technical aspects in electric power industrial utilization • Able to recommend strategy to improve efficiency, quality, and power quality in electrical engineering system • Able to combine new and renewable generator to electrical network system • Able to evaluate strategy and risk mitigation in the development of electric power system who are reliable, secure, enviromentally friendly 	

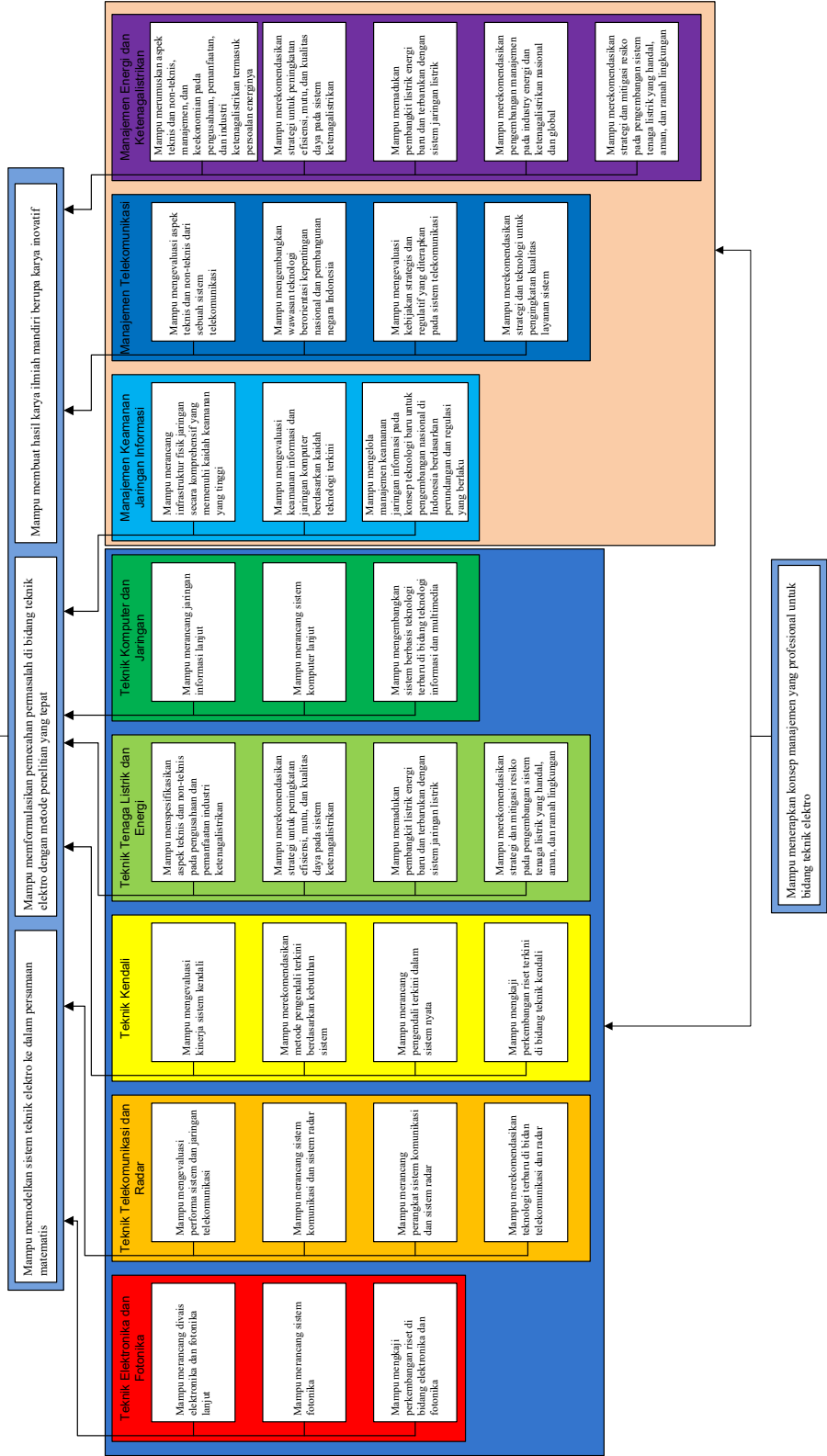
12	<p>Majoring in multimedia and information network:</p> <ul style="list-style-type: none"> • Able to design advanced information network • Able to design advanced computer system • Able to develop the latest technology based system in the field of information technology and multimedia <p>Majoring in information network security:</p> <ul style="list-style-type: none"> • Able to design physical infrastructure in a comprehensive manner that meets high security rules • Able to analyse information security management in new technological concept for national indonesia development • Able to evaluate the information network security based on the rule of technology, legislation, and regulations that apply <p>Majoring in telecommunication management:</p> <ul style="list-style-type: none"> • Able to evaluate the technical and non-technical aspects of a telecommunication system • Able to recommend strategies and technology for the improvement of the service quality system • Able to develop insight of technology which oriented to national interests and indonesia development • Able to evaluate strategic and regulative policies that are applied to the telecommunication system <p>Majoring in electrical power management and energy:</p> <ul style="list-style-type: none"> • Able to formulate the technical and non-technical aspects, management, and business development and utilization on electrical power industrial economics including energy issues • Able to recommend strategies for increased efficiency, quality, and the quality of the electrical power system • Able to integrate new energy power generation and renewable electric network system • Able to recommend risk mitigation strategies and on the development of electric power system which are reliable, secure, and environmentally friendly 		
13	Classification of Subjects		
No	Classification	Credit Hours (SKS)	Percentage
i	Core Subjects	19	45.23%
ii	Majoring Courses	23	54.77%
	Total		100 %
14	Total Credit Hours to Graduate		42 SKS

Career Prospects

The graduates of this program have been employed in various industrial companies such as power engineering, IT, electronic, oil & gas, telecommunication and other related industries. Some of graduates were even employed before the graduation. Some occupation or job titles that are suitable for this program are electrical engineer, process engineer, control engineer, instrumentation engineer, program manager, project manager, technical manager and professional lecturers.

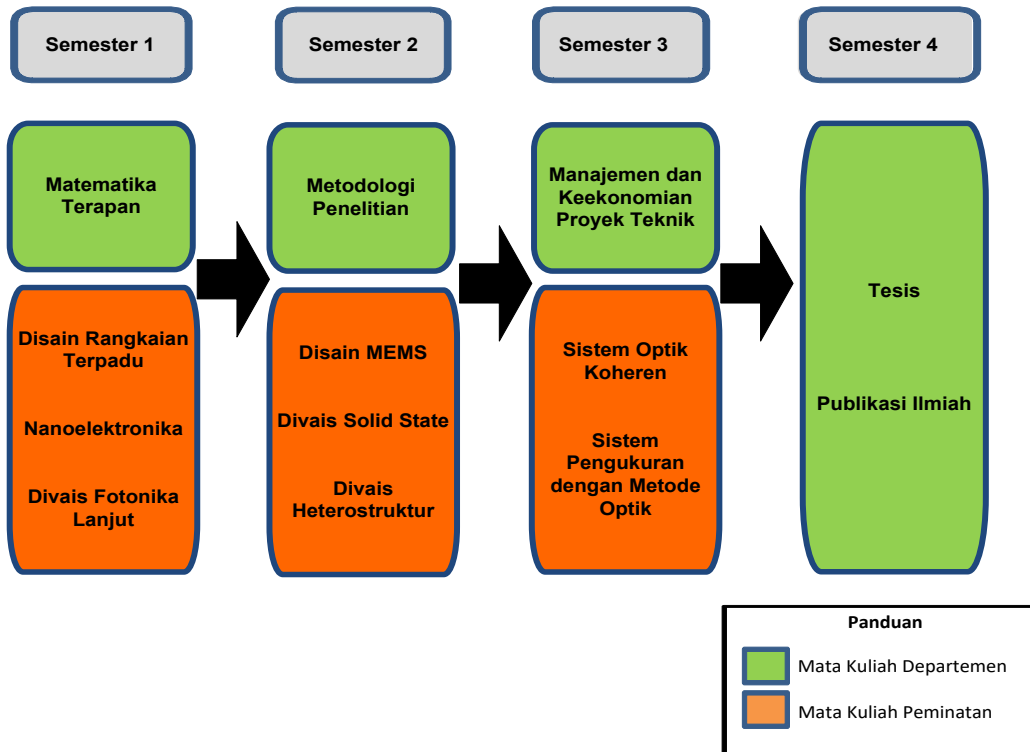
Learning Outcome

Magister teknik yang mampu memformulasikan pemecahan masalah kompleks di bidang teknik elektro melalui riset berbasis teknologi terkini dengan pendekatan inter atau multidisiplin sesuai etika profesi



FLEW DIAGRAM OF SUBJECTS

Diagram Alir Mata Kuliah Peminatan Teknik Elektronika dan Fotonika



ELECTRICAL ENGINEERING

Diagram Alir Mata Kuliah Peminatan Teknik Telekomunikasi dan Radar

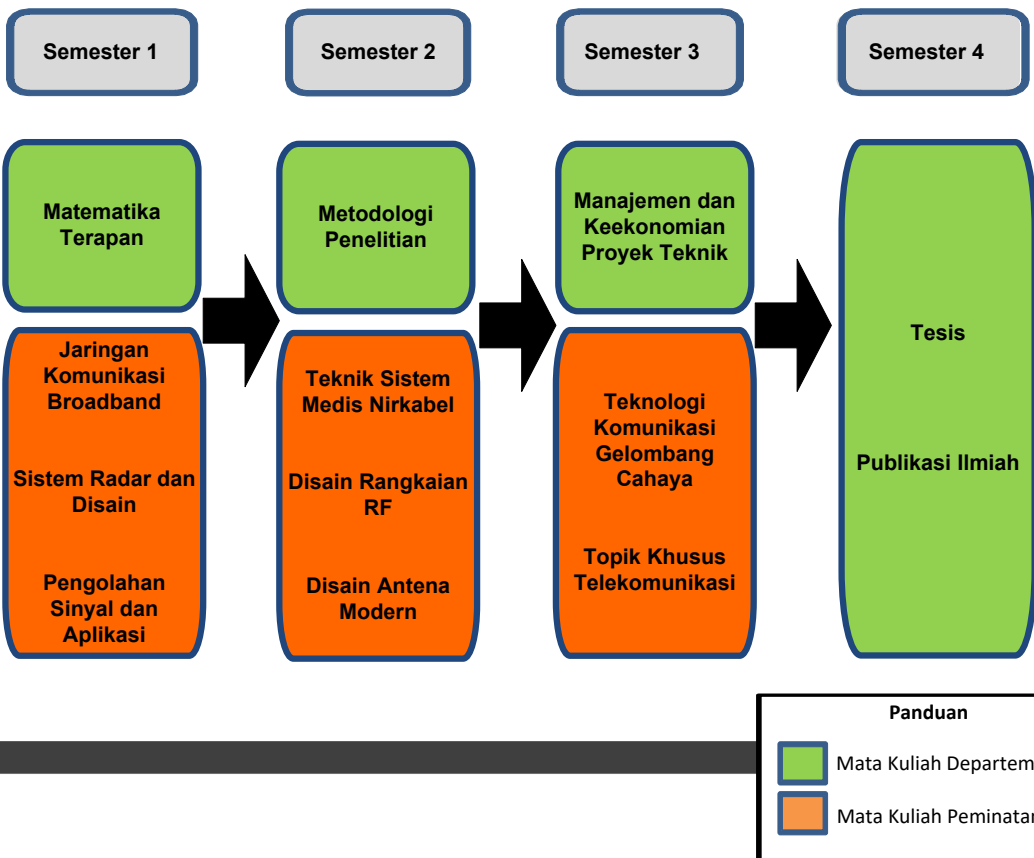


Diagram Alir Mata Kuliah Peminatan Teknik Kendali

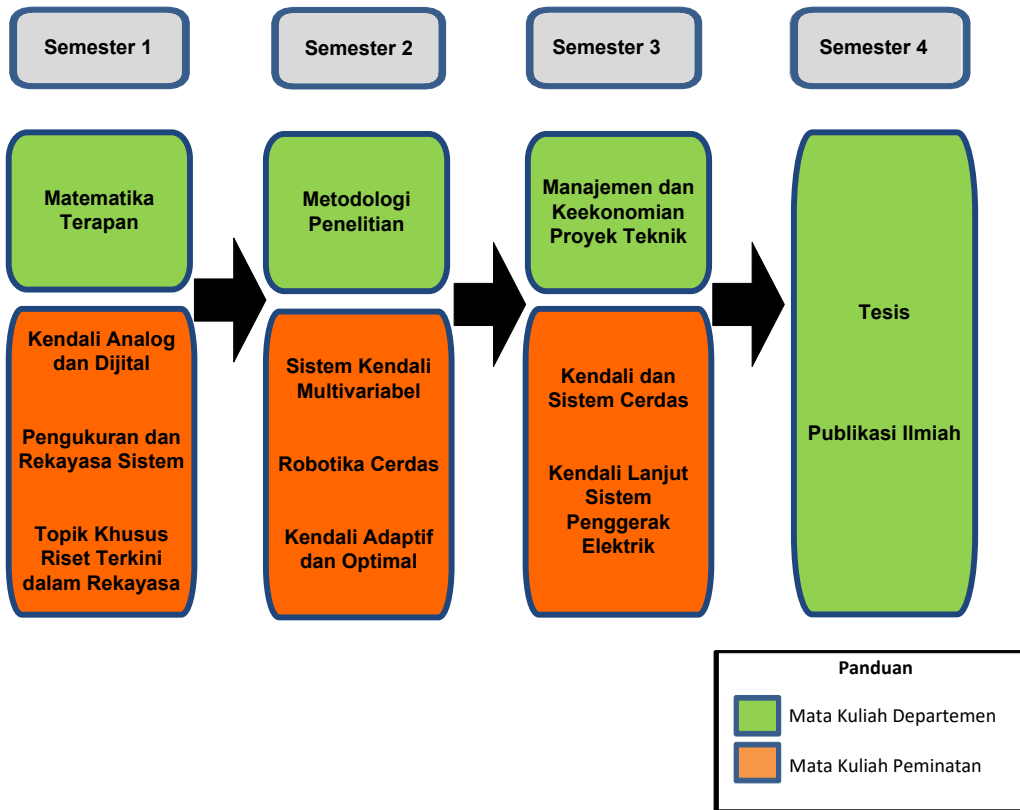


Diagram Alir Mata Kuliah Peminatan Teknik Tenaga Listrik dan Energi

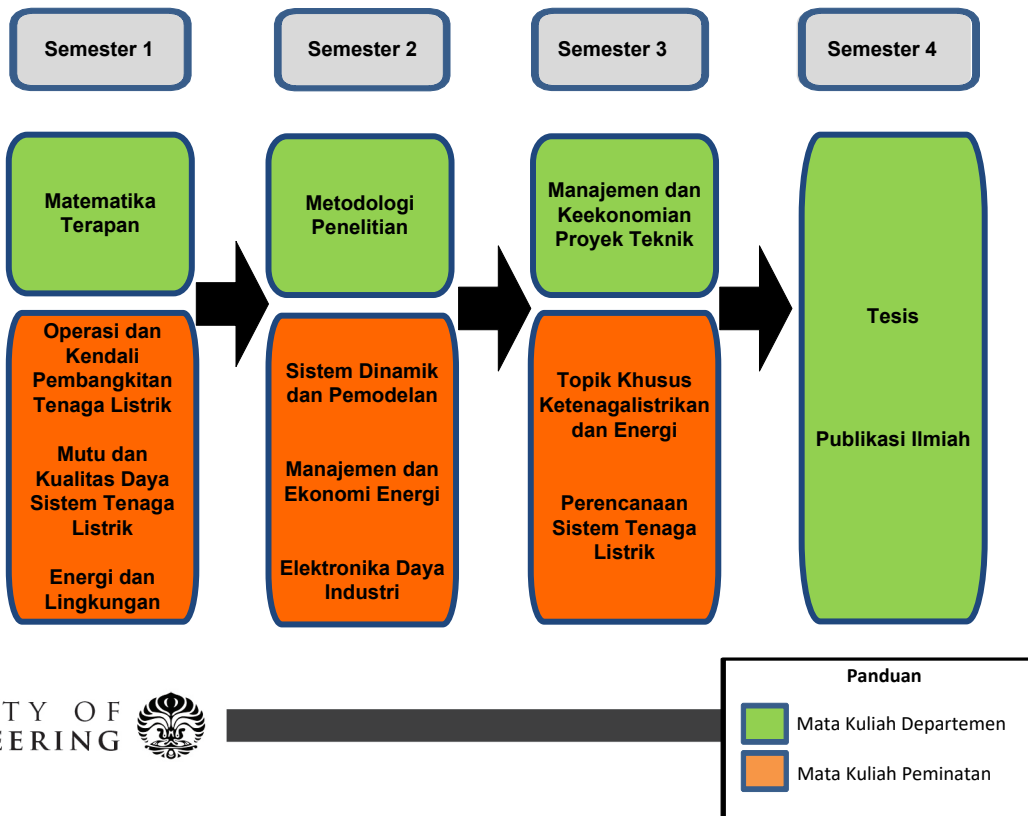


Diagram Alir Mata Kuliah Peminatan Teknik Komputer dan Jaringan

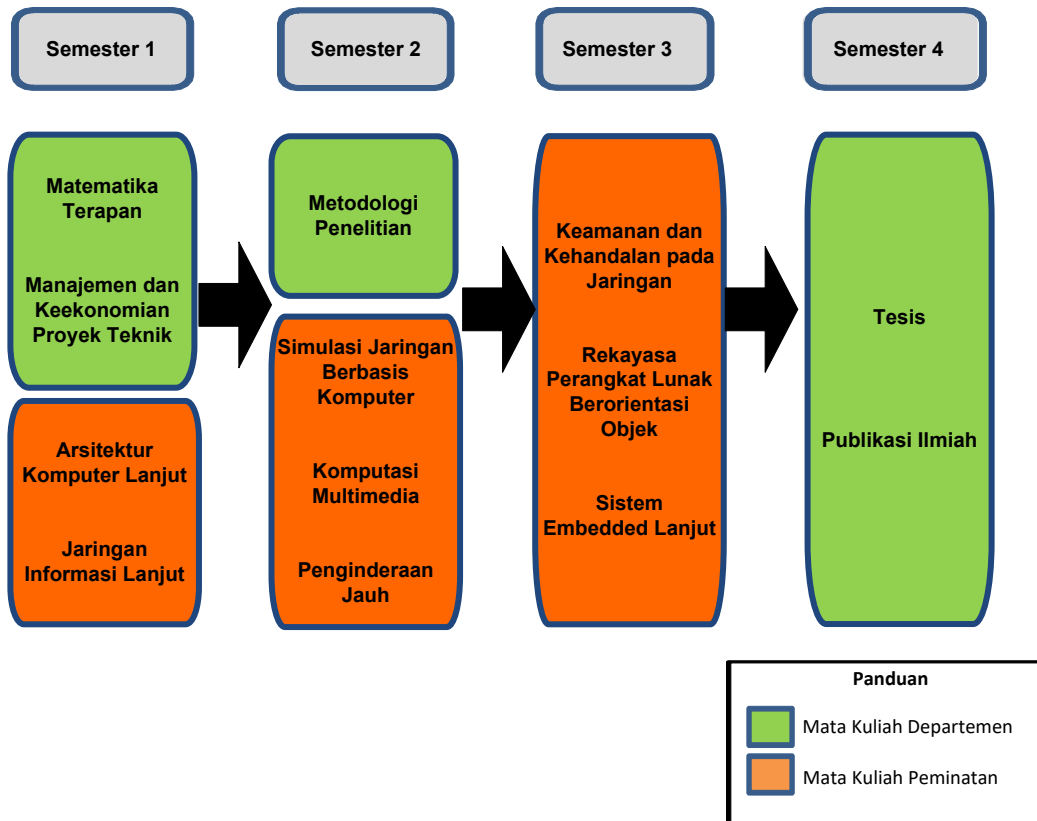


Diagram Alir Mata Kuliah Peminatan Manajemen dan Keamanan Jaringan Informasi

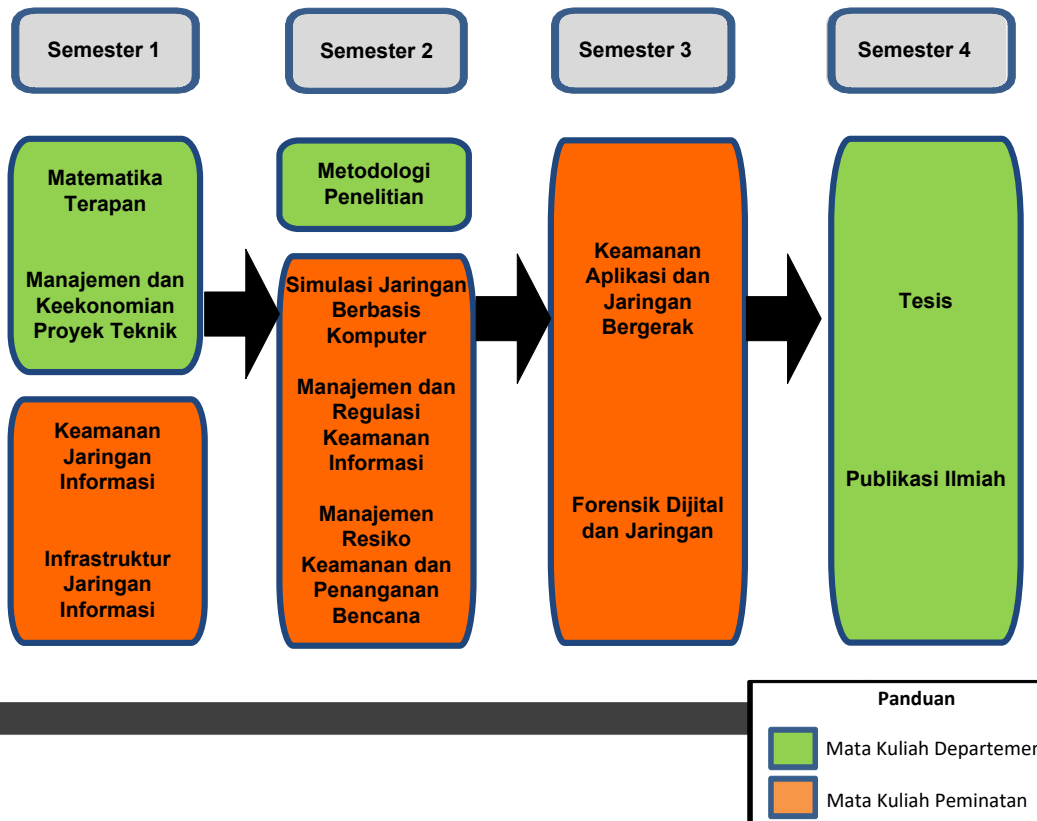


Diagram Alir Mata Kuliah Peminatan Manajemen Telekomunikasi

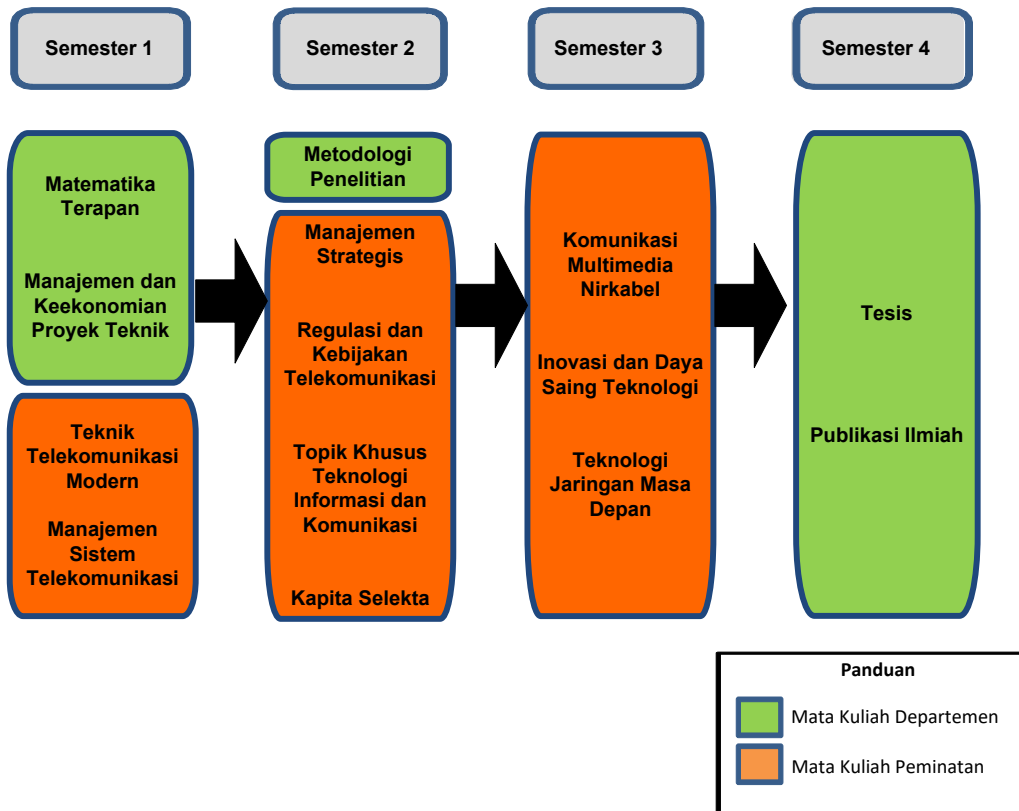
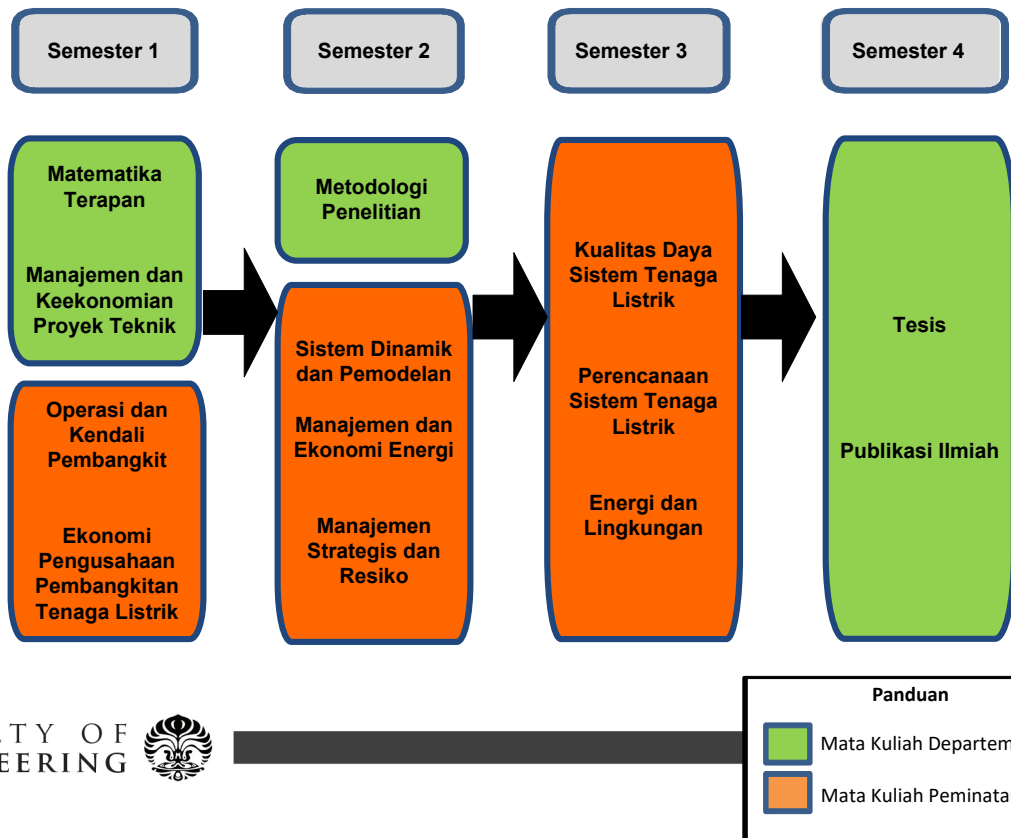


Diagram Alir Mata Kuliah Peminatan Manajemen Energi dan Ketenagalistrikan



**POST-GRADUATE CURRICULUM COURSES
DEPARTMENT OF ELECTRICAL ENGINEERING**

ELECTRONICS ENGINEERING AND PHOTONICS

	MATA KULIAH	SUBJECT	
	Semester 1	1st Semester	
ENEE800001	Matematika Terapan	Applied Mathematics	3
ENEF801001	Disain Rangkaian Terpadu	Integrated Circuit Design	3
ENEF801002	Nanoelektronika	Nanoelectronics	3
ENEF800303	Divais Fotonik Lanjut	Advanced Photonic Devices	3
		Subtotal	12
	Semester 2	2nd Semester	
ENEF802004	Disain MEMS	MEMS Design	3
ENEF802005	Divais Solid State	Solid State Devices	3
ENEF802006	Divais Hetero-struktur	Hetero - structure Devices	3
ENEE802002	Metodologi Penelitian	Research Method	3
		Subtotal	12
	Semester 3	3rd Semester	
ENEE803003	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management	3
ENEF803007	Sistem Optik Koheren	Optical Coherent System	2
ENEF803008	Sistem Pengukuran dengan Metode Optik	Optical Method for Measurement System	3
		Subtotal	8
	Semester 4	4rd Semester	
ENEE804004	Tesis	Thesis	8
ENEE804005	Publikasi Ilmiah	Publication	2
		Subtotal	10
		TOTAL	42

TELECOMMUNICATIONS ENGINEERING AND RADAR

	MATA KULIAH	SUBJECT	
	Semester 1	1st Semester	
ENEE800001	Matematika Terapan	Applied Mathematics	3
ENET801001	Jaringan Komunikasi Broadband	Mobile Broadband System Networks	3
ENET801002	Sistem Radar dan Disain	Radar Systems and Design	3
ENET801003	Pengolahan Sinyal dan Aplikasi	Digital Signal Processing and Applications	3
		Subtotal	12
	Semester 2	2nd Semester	
ENEE802002	Metodologi Penelitian	Research Methodology	3
ENET802004	Teknik Sistem Medis Nirkabel	Wireless Medical System Engineering	3
ENET802005	Disain RF Lanjut	RF Engineering Design	3
ENET802006	Disain Antena Modern	Modern Antenna Design	3

			Subtotal	12
Semester 3		3rd Semester		
ENET803007	Teknologi Komunikasi Gelombang Cahaya	Lightwave Communication Technology		3
ENET803008	Topik Khusus Telekomunikasi	Special Topic in Telecommunication		2
ENEE803003	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management		3
			Subtotal	8
Semester 4		4rd Semester		
ENEE804004	Tesis	Thesis		8
ENEE804005	Publikasi Ilmiah	Scientific Publication		2
			Subtotal	10
			TOTAL	42

CONTROL TECHNIQUES

MATA KULIAH		SUBJECT		
Semester 1		1st Semester		
ENEE801001	Matematika Terapan	Applied Mathematics		3
ENEC801001	Kendali Analog dan Digital	Analog and Digital Control		3
ENEC801002	Topik Khusus Riset Terkini dalam Rekayasa	Special Topic on Advance Research in Engineering		3
ENEC801003	Pemodelan dan Rekayasa Sistem	Modeling and System Engineering		3
			Subtotal	12
Semester 2		2nd Semester		
ENEE802002	Metodologi Penelitian	Research Method		3
ENEC802004	Sistem Kendali Multivariabel	Multivariable Control Systems		3
ENEC802005	Robotika Cerdas	Intelligent Robotics		3
ENEC802006	Kendali Adaptif dan Optimal	Adaptive and Optimal Control		3
			Subtotal	12
Semester 3		3rd Semester		
ENEC803007	Kendali dan Sistem Cerdas	Intelligent System and Control		3
ENEC803008	Kendali Lanjut Sistem Penggerak Elektrik	Advanced control on electric drive system		2
ENEE803003	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management		3
			Subtotal	8
Semester 4		4rd Semester		
ENEE804004	Tesis	Thesis		8
ENEE804005	Publikasi Ilmiah	Scientific Publication		2
			Subtotal	10
			TOTAL	42

ELECTRIC POWER AND ENERGY ENGINEERING

	MATA KULIAH	SUBJECT	
	Semester 1	1st Semester	
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENEP801001	Operasi dan Kendali Pembangkitan Tenaga Listrik	Power Generation Operation and Control	3
ENEP801002	Mutu dan Kualitas Daya Sistem Tenaga Listrik	Electrical Power System Quality	3
ENEP801003	Energi dan Lingkungan	Energy and Environment	3
		Subtotal	12
	Semester 2	2nd Semester	
ENEE802002	Metodologi Penelitian	Research Method	3
ENEP802004	Sistem Dinamik dan Pemodelan	Dynamic System and Modeling	3
ENEP802005	Manajemen dan Ekonomi Energi	Economics Energy and Management	3
ENEP802006	Elektronika Daya Industri	Industrial Power Electronics	3
	Semester 3	3rd Semester	
ENEE803003	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management	3
ENEP803007	Topik Khusus Ketenagalistrikan dan Energi	Special Topic in Power System and Energy	2
ENEP803008	Perencanaan Sistem Tenaga Listrik	Power System Planning	3
		Subtotal	8
	Semester 4	4rd Semester	
ENEE804004	Tesis	Thesis	8
ENEE804005	Publikasi Ilmiah	Publication	2
		Subtotal	10
		TOTAL	42

COMPUTER ENGINEERING AND NETWORKS

	MATA KULIAH	SUBJECT	
	Semester 1	1st Semester	
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENCN803007	Rekayasa Perangkat Lunak Berorientasi Objek	Object Oriented based Software Engineering	3
ENCN801001	Arsitektur Komputer Lanjut	Advanced Computer Architectures	3
ENCN801002	Jaringan Informasi Lanjut	Advanced Information Networks	3
		Subtotal	12
	Semester 2	2nd Semester	
ENEE802002	Metodologi Penelitian	Research Method	3
ENCN802003	Simulasi Jaringan Berbasis Komputer	Computer Based Network Simulation	3
ENCN802004	Komputasi Multimedia	Multimedia Computing	2
ENCN802005	Penginderaan Jauh	Remote Sensing	3
		Subtotal	11

Semester 3		3rd Semester	
ENCN803006	Keamanan dan Keandalan pada Jaringan	Network Security and Reliability	3
ENEE803003	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management	3
ENCN803008	Sistem Embedded Lanjut	Advanced Embedded Systems	3
		Subtotal	9
Semester 4		4rd Semester	
ENEE804004	Tesis	Thesis	8
ENEE804005	Publikasi Ilmiah	Publication	2
		Subtotal	10
		TOTAL	42

INFORMATION NETWORK SECURITY MANAGEMENT

MATA KULIAH		SUBJECT	
Semester 1		1st Semester	
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENMS801001	Keamanan Jaringan Informasi	Information Network Security	3
ENMS801002	Infrastruktur Jaringan Informasi	Information Network Infrastructure	3
ENEE803003	Manajemen Proyek dan Keekonomian Teknik	Project Management & Engineering Economic	3
		Subtotal	12
Semester 2		2nd Semester	
ENEE802002	Metodologi Penelitian	Research Methodology	3
ENMS802003	Simulasi Jaringan Berbasis Komputer	Computer Based Network Simulation	3
ENMS802004	Manajemen dan Regulasi Keamanan Informasi	Information Security Management and Regulation	3
ENMS802005	Manajemen Risiko Keamanan dan Penanganan Bencana	Security Risk Management & Disaster Recovery	3
		Subtotal	12
Semester 3		3rd Semester	
ENMS803006	Keamanan Aplikasi dan Jaringan Bergerak	Application and Mobile Network Security	4
ENMS803007	Forensik Digital dan Jaringan	Network and Digital Forensic	4
		Subtotal	8
Semester 4		4rd Semester	
ENEE804004	Tesis	Thesis	8
ENEE804005	Publikasi Ilmiah	Publication	2
		Subtotal	10
		TOTAL	42

CURRICULUM OF ELECTRICAL ENGINEERING DEPARTMENT SPECIAL POST-GRADUATE CLASS IN SALEMBA

TELECOMMUNICATIONS MANAGEMENT

	MATA KULIAH	SUBJECT	
	Semester 1	1st Semester	
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENMT801001	Teknik Telekomunikasi Modern	Modern Telecommunications Engineering	3
ENMT801002	Manajemen Sistem Telekomunikasi	Management of Telecommunications System	3
ENEE803003	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management	3
		Subtotal	12
	Semester 2	2nd Semester	
ENEE802002	Metodologi Penelitian	Research Methodology	3
ENMT802003	Manajemen Strategis	Strategic Management	3
ENMT802004	Regulasi dan Kebijakan Telekomunikasi	Telecommunications Policy and Regulation	2
ENMT802005	Topik Khusus Teknologi Informasi dan Komunikasi	Special Topic in ICT (Information and Communications Technology)	2
ENMT802006	Kapita Selecta	Capita Selecta	2
		Subtotal	12
	Semester 3	3rd Semester	
ENMT803007	Komunikasi Multimedia Nirkabel	Multimedia Wireless Communications	2
ENMT803008	Inovasi dan Daya Saing Teknologi	Technological Innovation and Competitiveness	3
ENMT803009	Teknologi Jaringan Masa Depan	Future Network Technology	3
		Subtotal	8
	Semester 4	4rd Semester	
ENEE804004	Tesis	Thesis	8
ENEE804005	Publikasi Ilmiah	Scientific Publication	2
		Subtotal	10
		TOTAL	42

ENERGY MANAGEMENT AND KETENAGALISTRIKAN

	MATA KULIAH	SUBJECT	
	Semester 1	1st Semester	
ENEE801001	Matematika Terapan	Applied Mathematics	3
ENEE801001	Manajemen dan Keekonomian Proyek Teknik	Engineering Economy and Project Management	3
ENME801001	Operasi dan Kendali Pembangkit Tenaga Listrik	Control and Operation of Power Generation Plant	3
ENME801002	Ekonomi Perusahaan Pembangkitan Tenaga Listrik	Electric Utility Power Generation Economics	3

		Subtotal	12
	Semester 2	2nd Semester	
ENEE802002	Metodologi Penelitian	Research Methodology	3
ENME802003	Sistem Dinamik dan Pemodelan	Dynamic Systems and Modeling	3
ENME802004	Manajemen dan Ekonomi Energi	Economics Energy and Management	3
ENME802005	Manajemen Strategis dan Resiko	Strategic Management and Risk	3
		Subtotal	12
	Semester 3	3rd Semester	
ENME803006	Kualitas Daya Sistem Tenaga Listrik	Electrical Power System Quality	2
ENME803007	Perencanaan Sistem Tenaga Listrik	Electric Power System Planning	3
ENME803008	Energi dan Lingkungan	Energy and Environment	3
		Subtotal	8
	Semester 4	4rd Semester	
ENEE804004	Tesis	Thesis	8
ENEE804005	Publikasi Ilmiah	Scientific Publication	2
		Subtotal	10
		TOTAL	42

SYLLABUS OF SUBJECTS

ENEE802002

RESEARCH METHOD

3 CREDITS

Learning Outcomes:**Syllabus:-****Prerequisite: -****References:**

1. Technical guidelines on the writing of Thesis students of University of Indonesia
2. IEEE Citation Reference
3. IEEE Transactions on Parallel and Distributed Systems, vol. 21, no. 2, February 2010, "How To Write Research Articles in Computing and Engineering Disciplines"

ENEE804005

SCIENTIFIC PUBLICATION

3 CREDITS

Learning Outcomes: Syllabus:-**Prerequisite: -****Reference:**

ENEE804004

THESIS

8 CREDITS

Learning Outcomes: In this course, students will be directed to develop independent research guided by a supervising professor or competent lecturer. After following this course the student is expected to be able to make a concept of research associated with existing theories. Under the guidance of a lecturer, students are expected to be able to design, integrate, implement, and analyze the concept, as well as write the results of his research into systematic paper in the form of thesis book. Students are also expected to be able to present and defend the concept and results of his research in front of the examiners in the thesis examination.

Syllabus:-**Prerequisite:** Have taken at least 24 SKS**Reference:**

1. Technical guidelines on the writing of Thesis students of University of Indonesia
2. IEEE Citation Reference
3. IEEE Transactions on Parallel and Distributed Systems, vol. 21, no. 2, February 2010, "How To Write Research Articles in Computing and Engineering Disciplines"

ENEE801001

APPLIED MATHEMATICS

3 CREDITS

Learning Outcomes: After completing the coursework, the student is expected to be able to apply the mathematical equations to solve engineering problems. In the application in the field of technology management, the purpose of this course is also to introduce the students to the statistical methods that can be used to formulate solutions to technical and business problems in a system and technology application.

Syllabus: Series, Differential Equations And Partial Differential, As Well As Some Of The Transformation; Probability and optimization, statistics, statistical methods; Mathematical Modeling For Business; Decision Analysis; Forecasting; Business Research For Managers; Optimization in the business and engineering; Theory Survey.

Prerequisite: None

Textbook:

1. E. Kreyzig, "Advanced Engineering Mathematics 9th Edition, John Wiley, 2006.
2. E.K.P. S.H., Chong dan Zak, "An Introduction to Optimization", 2nd Edition, John Wiley, 2001.
3. Safety Levin and D.S. Rubin, "Statistics for Management", Prentice Hall, 1997.
4. D.R. Anderson, D.J. Sweeney, T.A. Williams, J.D. Martin Camm, R.K., "Quantitative Methods for Business", South Western College Publication, 2009.

ENEE803003

ENGINEERING ECONOMY AND PROJECT MANAGEMENT

3 CREDITS

Learning Outcomes: this course aims to build the competency in evaluating economics and management aspects of the projects, so that students are expected to understand the basic theories to support investment and developing feasibility analysis of service/application technology.

Syllabus: Basics of project and project management; Organizational structure; Management function; Leadership in environmental projects; Conflict Management; Analysis of investment; Analysis of control for infrastructure development; Costs and allocation of wealth; Risk management and control.

Prerequisite: None

Textbook:

1. H. Kerzner, "Project Management: A Systems Approach to Planning, Scheduling and Controlling", John Wiley & Sons, 2009.
2. J.R. Mantel, S.J., Meredith Jr. "Project Management: A production management Approach", 6th Edition, John Wiley & Sons, 2006.

ENEF801001

INTEGRATED CIRCUIT DESIGN

3 CREDITS

Learning Outcomes: Capable of designing and analyzing a series of simple integrated electronics.

Syllabus: Technology component of integrated circuit; CMOS Technology; CMOS analog circuit modelling; Properties of device; Operational amplifier sub circuit with CMOS analog; CMOS amplifiers; Analog to Digital converter; Digital to Analog Converter; Computer-based electronic circuit design.

Prerequisite: None

Textbook:

1. R. S. Muller and T.I. Kamins, "Device Electronics for Integrated Circuits", 2nd Edition, John Wiley and Sons, 1986.
2. Boyleslad R.L. & I. Nashelsky, "Electronic Devices & Circuit Theory", 10th Edition, Prentice Hall, 2008.

ENEF803007

OPTICAL COHERENT SYSTEMS

3 CREDITS

Learning Outcomes: Able to design and simulate an optical coherent system

Syllabus: Narrowing Linewidth light source; Injection-locked for light source; Heterodyne receiver system; Integrated Devices for Optical Communication Systems; Direct Detection

Optical Communication Systems; Coherent System Structure for high speed optical fiber communication; Performance Degradation Sources in Coherent Optical Systems; Multilevel Coherent Optical Systems; Multichannel Optical Systems.

Prerequisite: None

Textbook:

1. S. Betti, g. d. Marchis & E Iannone, "Coherent Optical Communication systems", 1st Edition, John Wiley, 1995.
2. S. Ryu, "Coherent Lightwave Communication systems", Artech House Publishers, 1995.

ENEF803008

OPTICAL METHOD FOR MEASUREMENT SYSTEM

3 CREDITS

Learning Outcomes: after seriously following this course student are expected to be able to design lasers, optical fiber and its application in various types of measurement systems.

Syllabus: basic concepts of laser and its properties; Optical phenomena: diffraction and interference; Basic concepts of fiber optics and its properties; Fiber optic sensors which include intensity, polarization and interference; Examples of some applications to measure various types of measurement: temperature, pressure and displacement.

Prerequisite: None

Textbook:

1. W. s. c. Chang, "Principles of Lasers and Optics", 1st Edition, Cambridge University Press, 2005.
2. F.T.S. Yu, "Fiber Optic Sensors", Marcel Dekker Inc., 2002.
3. U.s. Moris, "Measurement and Instrumentation Principles", Butterworth-Heineman, 2001.

ENEF801003

ADVANCED PHOTONIC DEVICES

3 CREDITS

Learning Outcomes: This course aims to provide a systematic introduction on modern photonics and its subsystem devices for applications in the field of optical communications, optical sensing and imaging, optical data storage and computing as well as solid state illumination.

Syllabus: Guided wave optics; Fiber optics; Optical resonator; Optical photons; photons and atom; Photons in semiconductor; Laser amplifiers; Photon Source semi-Conductor; Photonic modulators: electro-optics, nonlinear optics and acousto optic.

Prerequisite: None

Textbook:

1. S.L. Chuang, "Physics of Western Digital my Devices", 2nd Edition, Wiley, 2009. ISBN-10:0470293195, ISBN-13:978-0470293195.
2. B.E.A. Saleh and M.C. Teich, "Fundamentals of Photonics", John Wiley & Sons, 1991.

ENEF802006

HETERO-STRUCTURE DEVICES

3 SKS

Learning Outcomes: Students are able to analyze the physical calculations regarding a hetero-structured device and principles of operations in a comprehensive manner.

Syllabus: Introduction to physical and the properties of the semi-conductor: direct and indirect bandgap; Heterojunctions; The design of the device of hetero-structure; Solar cells; Photo detectors; LEDs.

Prerequisite: None

Textbook:

1. S.M. Sze, C. Ng, "Physic of Semiconductor Devices", 3rd Edition, John Wiley & Sons, 2006.
2. J.P. McKelvey, "Solid State and Semiconductor Physics", Robert e. Krieger Publishing Company, 1986.

ENEF802005

SOLID STATE DEVICES

3 CREDITS

Learning Outcomes: After completing the coursework, the students are able to design a simple solid state devices such as: MIS Diode, Charge Couple Devices, Tunnel devices, IMPATT and Related Transit - Time Devices, Transferred Electron Devices

Syllabus: MIS Diode; Charge Couple Devices; Tunnel devices; IMPATT and Related Transit - Time Devices; Transferred Electron Devices

Prerequisite: None

Textbook:

1. S.M. Sze, C. Ng, "Physic of Semiconductor Devices", 3rd Edition, John Wiley & Sons, 2006.
2. R.F. Pierred, "Advanced Semiconductor Fundamentals", 2nd Edition, Pierson publishers, 2002.

ENEF802004

MEMS DESIGN

3 CREDITS

Learning Outcomes: After completing the coursework, students are able to design and analyze simple MEMS-based device. In addition, students will become acquainted with the process of fabrication of MEMS and micro-sensor and its application in the industry.

Syllabus: Introduction to MEMS; Materials for MEMS; Micromachining Process; The structure and system of MEMS on industrial and automotive applications; Structure and application of Photonic MEMS System; MEMS application in the life sciences; The structure and application of MEMS Structures on the application of RF; Packaging and reliability considerations for MEMS.

Prerequisite: None

Textbook:

1. Nadim Maluf Kirt & William, "An Introduction to Microelectromechanical Systems Engineering, Second Edition, Artech House Inc., 685 Canton Street Norwrod, MA02062, USA, 2004
2. Mohamed Gad El rights MEMS Handbook, CRC Press LLC, 222 Rosewood Drive-Denvers, MA01423, USA, 2004

ENEF801002

NANOELECTRONICS

3 CREDITS

Learning Outcomes: After completing the coursework, the student is able to evaluate nanoelectronic devices using quantum mechanics principle

Syllabus : Physical limit of IC and expectation of semiconductor nanostructures; basic quantum theory of nanoelectronics; solid state and low dimensional physics; numerical simulation for nanoelectronics; quantum well, wires, dots; nano structure and semiconductor device; tunneling effect and its application; resonance tunneling diodes and superlattice; quantum well laser; nano-photonics; organic electronics; single electron devices

Prerequisite: None

Textbook:

G.W. Hanson, "Fundamental of Nanoelectornics" CRC Press, 2005

ENET801001

BROADBAND COMMUNICATION NETWORK

3 CREDITS

Learning Outcomes: Able to analyze the performance of the latest generation of communication systems.

Syllabus: High Data rates in Mobile Communication, LTE and SAE; OFDM Transmission; Single Carrier Transmission; Scheduling and Link Adaptation, LTE radio access; The LTE radio interface architecture; The downlink and uplink transmission schemes; LTE access procedure; Multipoint Coordination and transmission; Broadband Multimedia and Multicast Services, Spectrum and RF Last; Performance Evaluation

Prerequisite: None

Textbook:

E. Dahlman, s. Parkvall, Skold, j. p. Beming, "3 G Evolution: HSPA and LTE for Mobile Broadband," 2nd Edition, Elsevier, 2008.

ENET803007

LIGHTWAVE COMMUNICATION TECHNOLOGY

3 CREDITS

Learning Outcomes: After following this course, students are expected to analyze components of Optical network communications and to design optical communication network

Syllabus: Introduction: computer networks and telecommunication; Types of fiber; Physical impairment, DWDM System; Overview of optical communication technology; SONET/SDH: multiplexing, framing, control and management, protection, packet-over-SONET, generic framing procedure; Optical transport network: WDM network elements, optical protection layer and restoration G. 709, GMPLS optical control plane; Design of WDM networks: topology design of light path, routing and wavelength assignment, model dimensions maximum load; Optical access network: a network of hybrid fiber-coaxial, optical passive network; Recent Advances: Western Digital my packet switching.

Prerequisite: None

Textbook:

1. G. Keiser, Optical Fiber Communications, McGraw-Hill, 3rd ed., 2000.
2. R. Ramaswami, Sivarajan, k. and g. Sasaki, "Optical Networks: A Practical Perspective", 3rd Edition, Morgan Kaufman Publishers 2008,2009,2010.
3. B. Mukherjee, "Optical WDM Networks (Optical Networks)," Springer, 2006. ISBN: 0387290559.

ENET801002

RADAR SYSTEMS AND DESIGN

3 CREDITS

Learning Outcomes: Able to evaluate the performance of the radar system.

Syllabus: Radar Equation; Influence of propagation; Radar-cross section target; Detection of signals in noise and pulse compression; Radar antenna; Short-range radar & cluster; Signal processing techniques of MTI & Pulse Doppler; Tracking & parameter estimation; The transmitter and receiver.

Prerequisite: None

Textbook:

1. Myocardial infarction and Skolnik, "Introduction to Radar systems," 3rd ed
2. M.A. Richard, J.A. Scheer, W.A. Holm, "Principle of Modern Radar: Basic principles," Scitech Publishing Inc., 2010.
3. Kang, E.W. "Radar System Analysis, Design and Simulation," Artech House ENEE800103, 2008.

ENET801003

SIGNAL PROCESSING AND APPLICATIONS

3 CREDITS

Learning Outcomes: Students are able to evaluate algorithms of signal processing by using FFT and transformation of signals.

Syllabus: Signal Analysis; Transient and frequency response; FT-Discrete FFT; Z transformation and its application in signal processing; Correlation and convolution; Digital filters: FIR and IIR; Multi-rate Signal Processing; Advanced Transformation (WHT, DCT, Wavelet transform) and its application; Project.

Prerequisite: None

Textbook:

1. E. C. Ifeachor and B.W. Jervis, "Digital Signal Processing: A Practical Approach", 2nd Edition, Addison Wesley, 2002.
2. S.M. Kuo, B.H. Lee & Ws Thian, "real-time DSP Implementations: & Applications", John Willey & Sons publishers, 2006.

ENET802006

MODERN ANTENNA DESIGN

3 CREDITS

Learning Outcomes: Able to design antennas for variety wireless technologies in particular the use of the micro strip antenna.

Syllabus: Basic theory of electromagnetic interference: Maxwell's equations, boundary conditions, equations of wave vector, Image theory; The antenna loop and wire; The ideal dipole; Synthesis Of Antennas; Antenna Aperture: the principle of equivalent; The basic parameters of the antenna measurement techniques. Micro-strip antenna includes slot patch antennas, Fractals antennas, bias technique, broadband technique, multiband technique, stacking antenna, miniaturization, EBG (Electromagnetic Bandgap) and Metamaterial. Mikrostrip antenna applications such as on GPS, wireless telecommunications, RFID antenna research and trend nowadays.

Prerequisite: None

Textbook:

1. C. Balanais, "Antenna Theory Analysis and Design -," 3rd Edition, Willey, 2005.
2. W.L. Stutzman and Gerald A. Thiele, "Antenna Theory & Design," John Willey & Sons, 2002.

ENET802004

WIRELESS MEDICAL SYSTEMS ENGINEERING

3 CREDITS

Learning Outcomes: Able to evaluate the influence of body tissue against wireless communication systems from within and around the human body; Able to identify wearable devices; Able to analyze Body-centric UWB communications; Able to analyze Body-sensor networks; Able to analyze Medical implant communication systems; Able to analyze wireless medical diagnosis.

Syllabus: The introduction of the rankings; Communication Wireless Body-Centric; Electromagnetic properties and modeling of the human body; Wearable device; UWB Communication Body-Centric; Body censor Network; Medical implant communication system; Diagnosis : Wireless medical Magnetic Resonance Imaging (MRI), MRI safety; Wireless

medical diagnosis: computed tomography microwave (CT), Ultrasound, imaging techniques further (PET, SPECT, Hybrid Method); Treatment technology of wireless; Interference Electromagnetic interference (EMI) on medical devices; Technology wireless power for medical implant devices.

Prerequisite: None

Textbook:

1. J.D. Bronzino & D.R. Peterson, The Biomedical Engineering Handbook, 4th ed., CRC Press, 2000.
2. P. Hall, "Antennas and Propagation for Wireless Communications BodyCentric," ArtechHouse, 2006.

ENET802005

ADVANCED RF DESIGN

3 CREDITS

Learning Outcomes: Able to design RF components, able to evaluate the performance of RF devices.

Syllabus: RF radio access networks design and essential: modulation, demodulation and multiple access techniques; LNA and Mixer design; Oscillator; Frequency Synthesizers; Design of Filter; Design of PA; Design of the wireless communication systems; Wireless LAN technology.

Prerequisite: None

Textbook:

1. D. m. Pozar, "Microwave Engineering" 3rd ed, Prentice Hall, 2008
2. A. Hussain, "Advanced RF Engineering for Wireless Systems and Networks", John Wiley and Sons, 2004.

ENET803008

SPECIAL TOPIC IN TELECOMMUNICATION

2 SKS

Learning Outcomes: Able to evaluate recent advancements in telecommunications technology

Syllabus:

Prerequisite:

Textbook:

ENEC801001

ANALOG AND DIGITAL CONTROL

3 CREDITS

Learning Outcomes: This course is an introduction to basic modeling, analysis, and feedback control systems design. This will give students insights into the problems of control and intuition about the methods available for resolving a problem. Both the frequency response and the state space method for analysis and design of the system of continuous time and discrete time are considered.

Syllabus: Open-loop control systems and closed loop; Basic concepts and definitions; Block diagrams; Nyquist diagram; Bode diagram design and analysis; Error analysis of steady-state; Root locus analysis and design; State space equations; Observabilities and controllability; The solution of equation of State; Design of controller using the pole placement method; Design observer full orders; The Transformation Of Z; The mapping between the s-plane and z-plane; Discrete-time state space; Design of controller using pole assignment; Design observer State; Deadbeat controller.

Prerequisite: None

Textbook:

1. Nise, N.S. "Control Systems Engineering", 5th Edition, Wiley (December 10, 2007), ISBN-10:0471794759, ISBN-13:978-0471794752.
2. K. Ogata, "Discrete-Time Control Systems", Prentice Hall; 2nd Edition, 1997. ISBN-10:0130342815, ISBN-13:978-0130342812.

ENEC801002

CURRENT RESEARCH ON SPECIAL TOPICS IN ENGINEERING

3 CREDITS

Learning Outcomes:

Syllabus:

Prerequisite:

Textbook:

ENEC802004

MULTIVARIABLE CONTROL SYSTEM

3 CREDITS

Learning Outcomes: Able to understand the concept of interacting loops in Multivariable system, analyze the stability of multivariable systems and designing a multivariable controller and domain defined and time domain.

Syllabus: Domain is defined: Multivariable system representation, input-output model, the interaction loop, relative gain array, the method of decoupling Baksenbom-Hood, stability; Time domain: model state space, form a diagonal, form handler, form observable, the stability of multivariable systems, controllability and observabilities, Poles and zeros, pole placement, method a method of decoupling Falb-design of Luenberger observer, Wolovich.

Prerequisite: None

Textbook:

1. P. Albertos and a. Sala, "Multivariable Control Systems: An Engineering Approach", SpringerVerlag, 2004.
2. K. Zhou, "Robust & Optimal Control", Prentice Hall, 1996.

ENEC801003

MODELING AND SYSTEMS ENGINEERING

3 CREDITS

Learning Outcomes: Able to simulate, identify and realize some of the physical model on certain software; In the application in the field of management of technology, this lecture also aims to model problems and cases that occur on the system technology so that it can support the ideal strategy design.

Syllabus: The basic Simulation and modeling: Physical Modeling, identification of Non-Parametric Models; Data Analysis: Least Square, Extended Least Square, Generalized Least Square Identification, Validation, Real-time. Modeling and Prototyping; Application Software: Matlab/ Simulink, PSpice, A Network Simulator; Modeling For System Technology; Modeling Engineering Systems; Design for improving the performance and quality of Applications technology.

Prerequisite: None

Textbook:

1. A. Law, "Simulation Modeling and Analysis", 4th Edition, McGraw-Hill, 2006.
2. B.P. Zeigler, T.G. Kim & h. Praehofer, "Theory of Modeling and Simulation", 2nd Edition, Academic Press, 2000.

ENEC802005

INTELLIGENT ROBOTICS

3 CREDITS

Learning Outcomes: Provide the knowledge and expertise to students to design robots moving in closed loop controller with sensor fusion. When realized, the simulation model OpenGL followed implementation real-word runs.

Syllabus: The introduction and implementation of sensors and actuators; Introduction to control systems; C programming for ATMEL AVR Microcontroller; Simulation modeling with OpenGL; Modeling of moving robot with sensors and its simulation with openGL; Live recocking, concepts of real-time systems; Advanced control system and communication; Navigation system; Monitoring Command-control; Localization; The concept of a knowledge-based system with the realization on the robot move.

Prerequisite: None

Textbook:

1. G. McComb Predko, m., "a Robot Builder Bonanza", 3rd Edition, McGraw-Hill, 2006, ISBN 0071468935/9780071468930.
2. J.M. Holland, "Designing Autonomous Mobile Robots: Inside the Mind of an Intelligent Machine", Newnes, 2004. ISBN-10:0750676833, ISBN-13:978-0750676830.

ENEC802006

ADAPTIVE AND OPTIMAL CONTROL

3 CREDITS

Learning Outcomes: Able to design controllers for slow time variation, process uncertainty and is not linear (local description depends on the operating point). This task can be realized with different types of Adaptive controller or controller-optimal where the control stick was replaced by off-line optimization made through limited worldview.

Syllabus: The Adaptive control structure; Online identification for process variation is slow as an extension method of least squares; Self-tuning controller-based estimates of the parameters and the combination of such different pole assignment controller and its variations to a minimum; Realization of adaptive control on Matlab; The realization of the practice: the time of sampling, modeling and supervision order online from loop control; Random processes; The function of the criteria; Robustness; quadratic linear controller; Kalman Filter; quadratic Gaussian linear controller; Reduced order controller.

Prerequisite: None

Textbook:

1. P.E. Wellstead and M.B. Zarrop, "Self-Tuning Systems: Control and Signal Processing," John Wiley and Sons, 1991.
2. J.B. Burl, "Linear Optimal Control: H₂ and H_∞ Methods," Addison Wesley, 1999.

ENEC803007

CONTROL AND INTELLIGENT SYSTEMS

3 CREDITS

Learning Outcomes: Study of intelligent computing method to build intelligent control system modelled on systems biology and human cognitive ability, adaptability and classification. Real

applications on a single input single output systems (ANTENNA) carried out experimentally.

Syllabus: An introduction to pattern recognition; Artificial neural network; Backpropagation; Self-organized map; Vector quantization; Identification system; System control; Experiment Of ANTENNA.

Prerequisite: None

Textbook:

1. Ham and F.M. i. Kostanic, "Principal of neurocomputing for science and engineering", McGraw-Hill, 2001.
2. J. Sarangapani, "Neural networks control of nonlinear discrete-time system", CRC Press, 2006.

ENEC803008

ADVANCED ELECTRIC DRIVE SYSTEM CONTROL

2 SKS

Learning Outcomes:

Prerequisite:

Textbook:

ENEP801001

THE OPERATION AND CONTROL OF ELECTRIC POWER GENERATION

3 CREDITS

Learning Outcomes: After completing the coursework, the student is able to operate the power plants geothermal and hydro power, distribution and power control systems and building electric power production cost models.

Syllabus: the properties of the power generation units; Economic Dispatch of Thermal Units; The influence of the transmission system; Unit Commitment; Generation with energy supply is limited; Hydrothermal Coordination; The model of production costs; Control generation; The exchange of power and energy.

Prerequisite: None

Textbook:

A.j. Wood and Wollenberg B.F., "Power Generation, Operation and Control", 2nd Edition, John Wiley & Sons Inc., 1996.

ENEP802004

DYNAMICAL SYSTEMS AND MODELING

3 CREDITS

Learning Outcomes:The student is able to design a dynamic model based on variable and determine parameters-owned model and compare the model obtained with various other models.

Syllabus:

Introduction to dynamical systems, cycle feedback, model Multivariable complex and multiobyektif, modeling and simulation, design models, dynamic urban changes, developments

Prerequisite: None

Textbook:

Claudius Gros, "Complex and Adaptive Dynamical Systems A Primer", Springer, 2008

ENEP801002

QUALITY AND QUALITY POWER ELECTRIC POWER SYSTEMS

3 CREDITS

Learning Outcomes: Able to analyze power system operating conditions, steady state on the condition and disrupt due to voltage swell/sag voltage and harmonic distortion.

Syllabus: Transient; Overvoltage; Undervoltage; Interruptions; Sags; Swells; Voltage Unbalance; Voltage fluctuations; Distortion of the wave form; Power frequency variation; Harmonic distortion; Current vs. Voltage distortion; Harmonic vs. Transient; Harmonic Control; The Design Of The Filter; Benchmarking the quality of power; Power generation distribution and quality; Wiring and grounding; Checking the quality of the resources.

Prerequisite: None

Textbook:

R.c. Dugan, M.F. Mc. Granaghan, s. Santoso, H. W. Beaty, "Electrical Power System Quality", 2nd Edition, Mc. Graw Hill, 2002.

ENME803006

ELECTRICAL POWER SYSTEM QUALITY

2 SKS

Learning Outcomes: Able to analyze power system operating conditions, steady state on the condition and disrupt due to voltage swell/sag voltage and harmonic distortion.

Syllabus: Transient; Overvoltage; Undervoltage; Interruptions; Sags; Swells; Voltage Unbalance; Voltage fluctuations; Distortion of the wave form; Power frequency variation; Harmonic distortion; Current vs. Voltage distortion; Harmonic vs. Transient; Harmonic Control; The Design Of The Filter; Benchmarking the quality of power; Power generation distribution and quality; Wiring and grounding; Checking the quality of the resources.

Prerequisite: None

Textbook:

R.c. Dugan, M.F. Mc. Granaghan, s. Santoso, H. W. Beaty, "Electrical Power System Quality", 2nd Edition, Mc. Graw Hill, 2002.

ENEP803008

POWER SYSTEM PLANNING

3 CREDITS

Learning Outcomes: Able to analyze the identity request estimates of changes in economic variables and are able to estimate the reliability of the system on the changing economic conditions.

Syllabus: an estimate of the increase in demand for electric power; Electric power supply for the long term; The planning of electric power generation (production); Plant maintenance scheduling of power systems; The factors electricity development strategic Indonesia; The prospect of the development of electricity in Indonesia; The model construction of electric power systems; Methods of optimization.

Prerequisite: None

Textbook:

1. X. Wang, J.R. McDonald, "Modern Power System Planning", McGraw Hill Book Co., 1994.
2. Venus, "Ketenagalistrikan Indonesia" Ganesh, PT. Prima, April 1995.

ENEP802005

ECONOMICS ENERGY AND MANAGEMENT

3 CREDITS

Learning Outcomes: Able to design the energy management system by applying the supply/ demand side management-related sources, both fossil and non-fossil.

Syllabus: Fossil and Non-Fossil sources; Power systems management: including generation, transmission and distribution of electric power; Supply management supply management and is known as the Integrated Resource Planning.

Prerequisite: None

Textbook:

1. J.M. Griffin, H.B. Steele, "Energy Economics and Policy", Academic Press, New York, 1980.
2. Venus, "Ketenagalistrikan Indonesia" Ganesh, PT. Prima, April 1995.

ENEP802006

INDUSTRIAL POWER ELECTRONICS

3 CREDITS

Learning Outcomes: Able to design applications in the field of high power semiconductor devices in the field of industry and the military.

Syllabus: Introduction to electric power systems and Power Semiconductor Switches; Diode Rectifier; Controlled Rectifier; Inverters; Resonant Converters and Switching power supply for D.C.; Power Conditioners and Uninterruptible Power Supplies; Introduction To Motor Drives; D.c. Motor Drives; Synchronous Motor Drives; Residential; Industrial and electric utility applications; Optimization system of utility interface with electric power systems.

Prerequisite: None

Text Book:

- N. Mohan, T.M. Undeland, W.P. Robbins, "Power Electronics", 3rd Edition, John Wiley and Sons, 2003.

ENEP801003

ENERGY AND ENVIRONMENT

3 CREDITS

Learning Outcomes: Able to analyze the effects of the use of energy that is friendly to the environment.

Syllabus: global warming caused by the use of fossil and non-fossil energy; Problem solving environment nationally and globally; The implementation of the Kyoto Protocol in the form of a Clean Development Mechanism; CO2 trading.

Prerequisite: None

Textbook:

1. Nazaroff, W.W. L.A. Cohen, "Environment Engineering Science", John Wiley and Sons, Inc., 2001.
2. R.a. Ristineu, J.J. Kroushaar, "Energy and Environment", John Wiley and Sons, Inc., 2006.

ENEP803007

SPECIAL TOPIC IN POWER SYSTEM AND ENERGY

2 SKS

Learning Outcomes: Able to evaluate the latest technological developments in the field of electric power and energy as well as provide mitigation over problems that arise.

Syllabus: Fossil and non-fossil energy, renewable energy generation, the reliability of electric power systems, renewable energy penetration into the electricity network, planning the development of the electric power system, the factors that affect the growth of the load, the effect of conventional power generation on the environment, factors that affect the development of the system

Prerequisite: None

Textbook:

ENCN801001

ADVANCED COMPUTER ARCHITECTURES

3 CREDITS

Learning Outcomes: Able to describe the architecture of the computer system; capable of analyzing sequences of instruction set. Students are also able to explain the detailed architecture of pipelining, superscalar and parallel systems and be able to analyze the parallel algorithm in computer systems.

Syllabus: Review instruction set architecture and its influence on performance: execution of the instruction, the influence of micro bus and system clock, system memory, system cache; Pipelining architecture: advantages, data, address and control conflicts, re-ordering instruction; Superscalar architecture: execution of dual stream; CISC and RISC; RISC architecture and its features: the rules of the register, the register of windows engineering and its effect on performance; Parallel architecture: shared memory, distributed memory, loosely coupled and tightly coupled; Cache consistency issues: examples of load balancing algorithms, parallel, message passing, the idea on the performance of a parallel algorithm.

Prerequisite: None

Textbook:

1. W. Stallings, "Computer Organization and Architecture", 7th Edition, Prentice Hall, 2007.
2. J.L. Hennessy, D.A. Patterson, "Computer Architecture, 5th Edition: A Quantitative Approach" (The Morgan Kaufmann Series in Computer Architecture and Design), 5th Edition, Morgan Kaufmann, 2011. ISBN-10:012383872X, ISBN-13:978-0123838728.
3. J.P. Shen and M.H. Lipasti, "Modern Processor Design: Fundamentals of Superscalar Processors", McGraw Hill Book, 2003 (Beta Eds).

ENCN801002

ADVANCED INFORMATION NETWORKS

3 CREDITS

Learning Outcomes: Able to elaborate on the concept of advanced information networks, the IP Protocol and its relationship with the Quality of Services (QoS). Students are also able to describe wireless network protocols, and explains the characteristics of traffic in real-time and non-real time, analyze the needs of QoS for video, audio and data traffic. Students are also able to analyze the future of the network towards the Next Generation Networks, and being able to analyze the network merger of telecommunications technology now.

Syllabus: The idea of modern information networks, QoS-based networks that rely on IP and IP-like protocols; Wireless and wired backbone network, wireless and wired access network; The characteristics of the traffic, real time traffic, traffic, traffic non realtime class of service; Traffic reservation protocols: SIP, ATM, RSVP, etc.; The idea of Quality of Service (QoS), QoS parameters, implementation of QoS. End to end QoS on the network of the future; Traditional ATM network:

class of services, label swapping, traffic congestion and the issue of reservation; MPLS network: Implementation Class of Services; Wireless networks: WiFi and WiMAX, QoS in WiMAX; Fiber-optic-based networks: IP issues at the top of the DWM; Next Generation Networks (NGN): incorporation of all types of telecommunications technology.

Prerequisite: None

Textbook:

W. Stallings, "High Speed Networks", Prentice Hall, 2002.

ENCN802003

COMPUTER BASED NETWORK SIMULATION

3 CREDITS

Learning Outcomes: After completing this course, the student is able to describe the role of network simulation research on a new Protocol in the internet and are able to implement and analyze network simulation using NS (Network Simulator) to conduct research in the network.

Syllabus: Introduction; Basic network simulation; NS basic: OTCL, an example of a simple simulation (topology, events, marking flows, monitoring a queue), architecture (nodes, links, applications, protocols, packets, loss modules, math support);

Event Scheduler; Network Components; Packet; Post Simulation: analyze the tracefile, the queue monitor (examples); Best Practice in Network Performance Evaluation Techniques; NS topology generation, OTCL and C++, routing (unicast, multicast, network dynamics), multicast transport; NAM network animator; Further features (abstraction, multicast, RTP/RTCP, SRM, QoS, Scenario generation, test suites); Developing the NS: Ns structure, OTCL linkage, adding new application and agent, queue; A new Protocol to NS: Header files, C++ code, the necessary changes, the TCL code; The introduction of the NS-3.

Prerequisite: None

Textbook:

1. J. f. Kurose and k. w. Ross, "Computer Networking A Top-Down Approach Featuring the Internet", Addison Wesley, 2003
2. A. Law and d. Kelton, "Simulation Modeling and Analysis", McGraw-Hill, 2001.
3. R. Jain. "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling", John Wiley and Sons, New York, 1991.

ENCN802004

MULTIMEDIA COMPUTING

3 CREDITS

Learning Outcomes: After following this course the students are able to describe and implement the technology in the field of multimedia and forwarded through the network. Students are able to analyze the components of the multimedia files, file compression techniques of multimedia, real time delivery of multimedia files, multimedia QoS in a network of computers, and also capable of analyzing the characteristics of the network to support distribution of multimedia files over the Internet.

Syllabus: The Concept Of Multimedia Computing; Digital representation of Audio: pictures and videos; The characteristics and requirements of multimedia data; Techniques and digital audio compression standards; Techniques and image and video compression standards; End to end QoS for digital audio and video communication; Multimedia communication network; Transport protocols; Support system for distributed multimedia applications; The terms and mechanisms of synchronization of multimedia network; Information indexing and acceptance of multimedia.

Prerequisite: None

Textbook:

1. G. Lu, "Communication & Computing for Distributed Multimedia Systems", Artech House, 1998.
2. K.R. Rao, Zoran s. Bojkovic, D.A. Milovanovic, "Multimedia Communication System: Techniques, Standards and Networks", Prentice Hall, PHTR, 2002.

ENCN802005

REMOTE SENSING

3 CREDITS

Learning Outcomes: After completing this course, students are able to describe and analyze the satellite remote sensing data processing using specific algorithms.

Syllabus: Introduction; Acquisition of images; Satellite observations of the land; Active and passive sensors (optical, Radar); Microwave; Analysis of Data: GIS (geographic information systems); The science buildings and land; Land use & land cover; Global remote Sensing.

Prerequisite: None

Textbook:

1. J.B. Campbell, "Introduction to Remote Sensing", Guilford press, New York, 1996.
2. C.H. Chen, "Signal and Image Processing for Remote Sensing," 2nd Edition, CRC Press, 2010.

ENCN803006

NETWORK SECURITY AND RELIABILITY

3 CREDITS

Learning Outcomes: After completing this course, the student is able to describe the protocol and model of a system of security in communications. Students are also able to analyze network vulnerabilities and implement security systems on the network and the web.

Syllabus: introduction to the issues of security and privacy related information systems; the basics on confidentiality, availability, integrities; Identity and authentication credentials; Protocols and data integrities; control access; The security model; Cryptographic systems and protocols for privacy; Network security & web; Intrusion detection and prevention; Vulnerabilities and attacks; Security risk analysis; Planning for recovery from disasters; Security rules; Audit security and ISO17799.

Prerequisite: None

Textbook:

1. R.r. Panko, "Corporate Computer and Network Security," Prentice Hall, 2004.
2. W. Stallings, "Cryptography and Network Security: Principles and Practice," 3rd Edition, Prentice Hall, 2003.

ENCN803007

OBJECT ORIENTED BASED SOFTWARE ENGINEERING

3 CREDITS

Learning Outcomes: After completing this course, the student is able to describe the concept of software engineering and model used in development of a software. Students are also able to analyze the problem, apply the critical stages of the life cycle of software, create documentation in software development, describes the specifications of the software based on software requirements and implement a verification method, implement the design in the form of programs, test program made, perform maintenance on the system, and generating complete documentation development system to create user instructions for a relatively complex system in the real world.

Syllabus: The concept of object-oriented software engineering; Problems in the development of software; Waterfall model; Approach to prototyping; Evolutionary developmental

model; Estimation of costs; Configuration management; Software metrics; Requirements engineering; Project management and risk; TSP, PSP: analysis, definitions, specifications, documentation of the draft specification of the software; Functional requirements and non-functional; Mastery Of The Unified Modeling Language (UML); Designing for reusability; Adaptability and care; The quality of architectural design software; Implementation of software; Designing and testing its implementation; Data modeling; Software maintenance; Documentation of the system.

Prerequisite: None

Textbook:

1. E. Braude, "Software Engineering: An Object Oriented Perspective", John Wiley and Sons, 2000.
2. E. Braude, m. Bernstein, "Software Engineering: Modern Approaches", John Wiley and Sons, 2010.
3. C. Larman, "Applying UML and Patterns: An Introduction to Object-oriented Analysis and Design and the Unified Process, Prentice Hall International, 2004.
4. D. Brown, "An Introduction to Object Oriented Analysis, UML and Object in Plain English", John Wiley and Sons, 2002.
5. E. Yourdon, "Modern Structured Analysis", Prentice Hall International, 1992.
6. Sommerville, "Software Engineering", 9th Edition, Addison Wesley, 2010.
7. R. Pressman, "Software Engineering: a Practitioner's Approach", 7th Edition, McGraw-Hill, 2009.

ENCN803008

ADVANCED EMBEDDED SYSTEMS

3 CREDITS

Learning Outcomes: At the end of the course students will have the ability to analyze, design and develop an embedded systems.

Syllabus: Introduction to embedded systems; Introduction to the software; Real-time model and scheduling; Recurring tasks/aperiodic; Share resources; Real-time OS; Case study: Mars Pathfinder, system components, communication, low power design, FPGA synthesis architecture, introduction, sample project embedded FPGA-based systems, the design and manufacture of FPGA-based embedded systems.

Prerequisite: None

Textbook:

1. P. Marwedel, "Embedded System Design," Springer Verlag, 2005.
2. W. Wolf, "u.s. Computers Components - Principles of Embedded Systems Design," Morgan Kauffman Publishers, 2000.

ENMS801001

INFORMATION NETWORK SECURITY

3 CREDITS

Learning Outcomes: After completing this course, the student is able to describe the protocols and model of a system of security in communications. Students are also able to analyze network vulnerabilities and implement security systems on the network and the web. In addition, students will be able to do the authentication techniques in Cryptography.

Syllabus: introduction to the issues of security and privacy Related information systems; The basics of the confidentiality, integrity, availability, Authentication and Identity; Protocols and Data integrity; Access Control; The Security Model; Cryptographic systems and protocols for privacy; Network Security & Web; Intrusion detection and prevention; Vulnerabilities And

Attacks; Security Risk Analysis; Planning for recovery from Disasters; Security Rules; Audit Security And ISO17799; Introduction To Cryptography; Encryption; Classic Encryption Technique; Standard Data encryption and password block; The Advanced Encryption Standard; Pseudo-Random Generation; Digital Signatures; Two-Party Protocols and Zero-Knowledge.

Prerequisite: None

Textbook:

1. R.r. Panko, "Corporate Computer and Network Security", Prentice Hall, 2004.
2. W. Stallings, "Cryptography and Network Security: Principles and Practice", 3rd Edition, Prentice Hall, 2003.
3. O. Goldreich, "Foundations of Cryptography: Basic Tools", Cambridge University Press, 2001.

ENMS801002

INFORMATION NETWORK INFRASTRUCTURE

3 CREDITS

Learning Outcomes: After completing this course, students will be able to design, implement and analyze the design of the server farm. Students will also be able to manage the server farm.

Syllabus: Introduction To Server Farms; Server Farm Protocols; Infrastructure Protocols; Security and Server Load Balancing; Data Center Design: Designing The Data Center Infrastructure; Integrating Security Into The Infrastructure; Performance Metrics of Data Center Devices; Data Center Administration and Management; State Of The Art Data Center, Procurement.

Prerequisite: None

Textbook:

1. M. Arregoces, m. Portolani, "Data Center Fundamentals", Cisco Press. 2004.
2. D. McCabe, "Network Analysis, Architecture and Design", 3rd Edition, Morgan Kaufman, 2007.
3. M. Lankhorst, "Enterprise Architecture at Work: Modeling, Communication and Analysis", 2nd Edition, Springer, 2009.
4. M. Liotine, "Mission-Critical Network Planning", Artech House, 2003.

ENMS802004

INFORMATION SECURITY MANAGEMENT AND REGULATION

3 credits

Learning Outcomes: At the end of this course the student is expected to understand the principles of information security and is able to apply those principles to design solutions for managing information security risk effectively. Students are expected to understand how to apply the principles of network security management of information in the context of the breadth and immediacy. Finally, the student is able to manage according to information network with the standard of the profession, ethics, regulation and legislation in force.

Syllabus: Management and security policy information; Threat management and weak information networks; Incident management and risk; Crisis management and Business Continuity; Cultural awareness and Security of information and information networks; Implementation Aspects Of Network Security Information; Legal aspects and regulations of information security; Certification of information security and information networks; SNI standard ISO/IEC 27001:2009.

Prerequisite: None

Textbook:

1. C.P. Pfleeger, Pfleeger, S.L. and "Security in Computing", 4th Edition, Prentice Hall, 2008.
2. M. Subramanian, "Network Management Principles & Practices", Pearson, 2010.

ENMS802005

SECURITY RISK MANAGEMENT AND DISASTER RECOVERY

3 CREDITS

Learning Outcomes: After completing this course, students are able to provide a standardized approach to regulating risk on network security through a proper framework to accommodate security strategies and their related costs. Students are also able to perform the recovery steps after the occurrence of the problem of network security information.

Syllabus: Introduction To The Security Risk Management; Risk Analysis; Approach To Risk Management; System Security Engineering; Regulation Of Security; The Issue Of Legality; Organizational Readiness Plan; Responding To The Incident; Plan a Strategy for the continuation of business; Disaster Recovery; Business continuation and crisis management.

Prerequisite: None

Textbook:

1. E. Wheeler, "Security Risk Management: Building an Information Security Risk Management Program from the Ground Up", Syngress, 2011.
2. T. r. Peltier, "Information Security Risk Analysis", 3rd Edition, Auerbach Publications, 2010.

ENMS803006

APPLICATION AND MOBILE NETWORK SECURITY

4 CREDITS

Learning Outcomes: After completing this course, the student is able to describe the forms of security attack on the application and the network computer, capable of analyzing the security issues on the application of either desktop based applications as well as web-based, as well as being able to implement the concept of security applications and computer networks.

Syllabus: Introduction to application security and computer networks; Detection Penetration Network; Detection Of The Penetration Of Web-Based Applications; The penetration detection in Wireless network; Secure coding in Java; Secure coding in PHP; Build a secure Database.

Prerequisite: None

Textbook:

1. G. McGraw, "Software Security: Building Security In", Pearson Education, Inc., 2006.
2. M. Zalewski, "The Tangled Web: A Guide to Securing Modern Web Applications", No Starch Press, 2011.

ENMS803007

NETWORK AND DIGITAL FORENSIC

4 CREDITS

Learning Outcomes: After following this course, the student is able to identify digital traces on the computer or on the network; being able to recognize forms of attack from the digital traces; able to analyze digital traces as well as being able to gather legal evidence.

Syllabus: Introduction to Digital Forensics and network; A Windows-Based Computer Forensics; The Linux-Based Computer Forensics; Forensics in computer network; Forensics on the mobile device.

Prerequisite: None

Textbook:

1. E. Casey, "Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet", 3rd Edition, Academic Press, 2011.
2. A. j. Marcella, Jr. and f. Guillossou, "Cyber Forensics: From Data to Digital Evidence", Wiley, 2010.

ENMT801001

MODERN TELECOMMUNICATIONS ENGINEERING

3 CREDITS

Learning Outcomes: This lecture aims to evaluate the basic principles of telecommunication system that is focused on environmental aspects of the application of modern telecommunications. By following this course, the student is expected to analyze a telecommunication system and calculate its technical aspects.

Syllabus: Digital communication systems; Elements of the technology in the channel transmission; Backbone network and backhaul; Fiber Optic Technology; Wireless Communication Technology; Analysis of the spectrum; Modulation and coding techniques; *Multiple Access Techniques*; *Evolution of 2 g-3 g-4 g Mobile Cellular Technology* ; *Fading power control Countermeasures*; *Capacity of Cellular Network*; The technology of *Broadband Wireless Access* more; IP based interconnection; The evolution of mobile moving towards 5 g; Wireless broadband access; Technology platform for the future: Digital TV, Satellite, Cloud Computing, Green IT; *Next Generation Network*; *Content Governance* ; Technology for Ubiquitous Network.

Prerequisite: None

Textbook:

1. R. Frieden, "International Telecommunications Handbook", Artech House, 1996.
2. R.L. Freeman, "Telecommunications System Engineering", Wiley-Interscience, 2004.
3. S. Park, "Strategies and Policies in Digital Convergence", Information Science Reference, 2007.
4. t. Rapaport, "Wireless Communications: Principles and Practice", Prentice Hall, 2002.

ENMT801002

MANAGEMENT OF TELECOMMUNICATIONS SYSTEM

3 CREDITS

Learning Outcomes: The material in this lecture will evaluate the basic concept of telecommunication management system including the concepts of the regulation for the implementation of the national telecommunication system.

Syllabus: Long-range planning; Business Feasibility Analysis; Wide Area Network; Telecommunications Operations - from fraud and disaster prevention to project management; Quality control and Security; Telecommunications Regulation; The Emerging Economics of Telecommunications; Economic Tools for the Telecommunications Strategies; Network and Marketing Plan; Analysis of Indonesian Telecommunications Act; Universal Service Obligation.

Prerequisite: None

Textbook:

1. J.K. Shaw, "Strategic Management in Telecommunications", Artech House Publishers, 2000.
2. J.K. Shaw, "the Telecommunications Deregulation and The Information Economy", 2nd Edition, Artech House Publishers, 2002.

ENMT802003

STRATEGIC MANAGEMENT

3 CREDITS

Learning Outcomes: After following this course, the participants of the lecture are expected to recommend the concept of strategic management to generate business excellence and

competitiveness of the industry. Students are expected to understand the applied theories and develop relevant strategies on industrial technology.

Syllabus: The nature of management strategy; *Strategy in Practice*; *External factors evaluation*; *Internal factors analysis*; *Strategy Analysis and Choices*; *Strategy Control Review and Evaluation*; *Quality Management*; *Strategy Management Of Global Problems*; Risk Management; Business Ethics ; *Corporate Level Strategy*; *Strategic Leadership*.

Prerequisite: None

Textbook:

1. David F.R. Friday, "Concepts of Strategic Management," 3rd Edition, Prentice Hall, 2010.
2. M.A. Hitt, R.D. Hoskisson, R.E., "Strategic Management: Concepts and Cases: Competitiveness and Globalization", 9th Edition, South-Western College Pub., 2010

ENMT802004

TELECOMMUNICATIONS POLICY AND REGULATION

2 SKS

Learning Outcomes: Able to evaluate aspects of national and international law, as well as the process of standardization in the telecommunications industry.

Syllabus: The International Telecommunication Organization; Indonesia's telecommunication laws and regulations; The making of public policy; Standardization process in it; International standardization body for the telecommunications industry; Universal Service Obligation; Case studies on policy and regulation of telecommunications in Indonesia and the world.

Prerequisite: None

Textbook:

1. Henry Julian Brand, "E.T." Leo, "The Law and Regulation of Telecommunications Carrier", Artech House Publishers, 1999.
2. P. de Bijl, m. Peitz, "Regulation and Entry into Telecommunications Markets", Cambridge University Press, 2002.

ENMT802005

SPECIAL TOPICS INFORMATION AND COMMUNICATIONS TECHNOLOGY

2 SKS

Learning Outcomes: Able to evaluate the various advancements in the field of ICT (information and communication technology).

Syllabus: The topics will focus on the recent technological platform such as 5G *mobile communications*, engineering multimedia, Wireless Sensor Networks, and other aspects of the technology and innovation. The topic will also cover technological understanding covering from "*physical layer*" to "*application layer*".

Prerequisite: None

Textbook: -

ENMT802006

CAPITA SELECTA

2 SKS

Learning Outcomes: The courses aims to build leadership supporting the telecommunications-related strategic planning. **Syllabus:** It includes strategic planning and holistic insights through a process of sharing knowledge with the stakeholders of telecommunications industry (vendors, operators, government). The topic may also include the areas of innovation, convergence,

macroeconomic, and another related issue.

Prerequisite: None

Textbook:

Handout

ENMT803007

MULTIMEDIA WIRELESS COMMUNICATIONS

3 CREDITS

Learning Outcomes: At the end of the lecture, students are able to design the design aspects of wireless multimedia technologies, including mobile and broadband network capable of calculating technical parameters.

Syllabus: Quality of Service; Compression techniques; Qualitative and Mathematical treatment of existing systems; Traffic Engineering for Wireless Communications; Mobility Management; Multimedia computing; Network Support for Multimedia communications; Interactive Multimedia System; Intersystem operation.

Prerequisite: None

Textbook:

1. T. Rapaport, "Wireless Communications: Principles and Practice", Prentice Hall, 2002.
2. K.R. Rao, Z.S. Bojkovic, D.A. Milovanovic, "Multimedia Communications System: Techniques, Standards and Networks", Prentice Hall, 2002.

ENMT803008

TECHNOLOGICAL INNOVATION AND COMPETITIVENESS

3 CREDITS

Learning Outcomes: At the end of this lecture, the student will be able to develop a holistic strategy of technological development for policy makers of the country or industry by considering the factors supporting system of innovation. In addition, students will also have insight into the leadership in using information and communication technologies so as to enhance the competitiveness of institutions and countries.

Syllabus: National and Sectoral Innovation System; Macroeconomic Theory and technological change; Evolutionary Theory; Innovation in the telecommunications industry; The management of R & D in telecommunications companies; Diffusion Of Technology; Innovation in ICT Services; Globalization, national competitiveness and economic growth; Science technology is preferred and Innovation Policy; Technological forecasting; Techno economy paradigm; Intellectual Property and Standardization; The Knowledge Economy and ICT paradigm; The Internet and economic policy; Policy and market in the era of the New Knowledge Economy

Prerequisite: None

Textbook:

1. J. Fagerberg, D.C. Mowery, r.r. Nelson, "The Oxford Handbook of Innovation", Oxford University Press, 2006.
2. R. Milson, d. Wilemon, "The Strategy of Managing Innovation and Technology", Prentice Hall, 2007.
3. R. Mansell Avgerou, c., d. Quah, r. Silverstone, "The Oxford Handbook of Information and Communication Technologies", Oxford University Press, 2007.

ENMT803009

FUTURE NETWORK TECHNOLOGY

3 SKS

Learning Outcomes The lecture aims to form a competency evaluation and design of technically related to telecommunication network System the latest technology both wireless and wireline, and telecommunications network management, management function

Syllabus: The function and role of the important telecommunications networks, modeling telecommunication networks, optical networking technologies, wireless network technology, the convergence of future network covering NGN and IMS, role and function of telecommunications network management,

Prerequisites: None

Textbook:

1. T. Plevyak, v. Sahin, "Next Generation Telecommunications Networks, Services and Management", Wiley-IEEE Press, 2010.
2. M. Guizaini, H.H. Chen, c. Wang, "The Future of Wireless Networks: Architectures, Protocols, and Services", CRC Press, 1999

ENME801002

ELECTRIC UTILITY POWER GENERATION ECONOMICS

3 CREDITS

Learning Outcomes: At the end of the lecture, a student is able to describe the method of operation of hydroelectric utilities efficiently without compromising with the development of the business.

Syllabus: Introduction; The utility of the organization; The principle of accounting accomplished; The value of time and money; Income requirements: fixed charge rate; Economic analysis methods; Electric utility system load; Operating system; The stability of the system: reserves, economic characteristics of generating units; Problems on the analysis of the total system; Renewable energy analysis and storage; A comparison of the unit directly; The development of the future.

Prerequisite: None

Textbook:

1. W.D. Marsh, "the Economics of Electric Utility Power Generation", Oxford University Press, 1980. ISBN-10:019856130X, ISBN-13:978-0198561309
2. W.G. Sullivan, E.M. Wicks, J.T. Luxhoj, "Engineering Economy", 13th Edition, Pearson Education Ltd., 2006.

ENME802005

STRATEGIC MANAGEMENT AND RISK

3 CREDITS

Learning Outcomes: This lecture aims to instill the concept of strategic management to generate business excellence and competitiveness of the industry. Students are expected to understand the applied theories and develop relevant strategies on industrial technology.

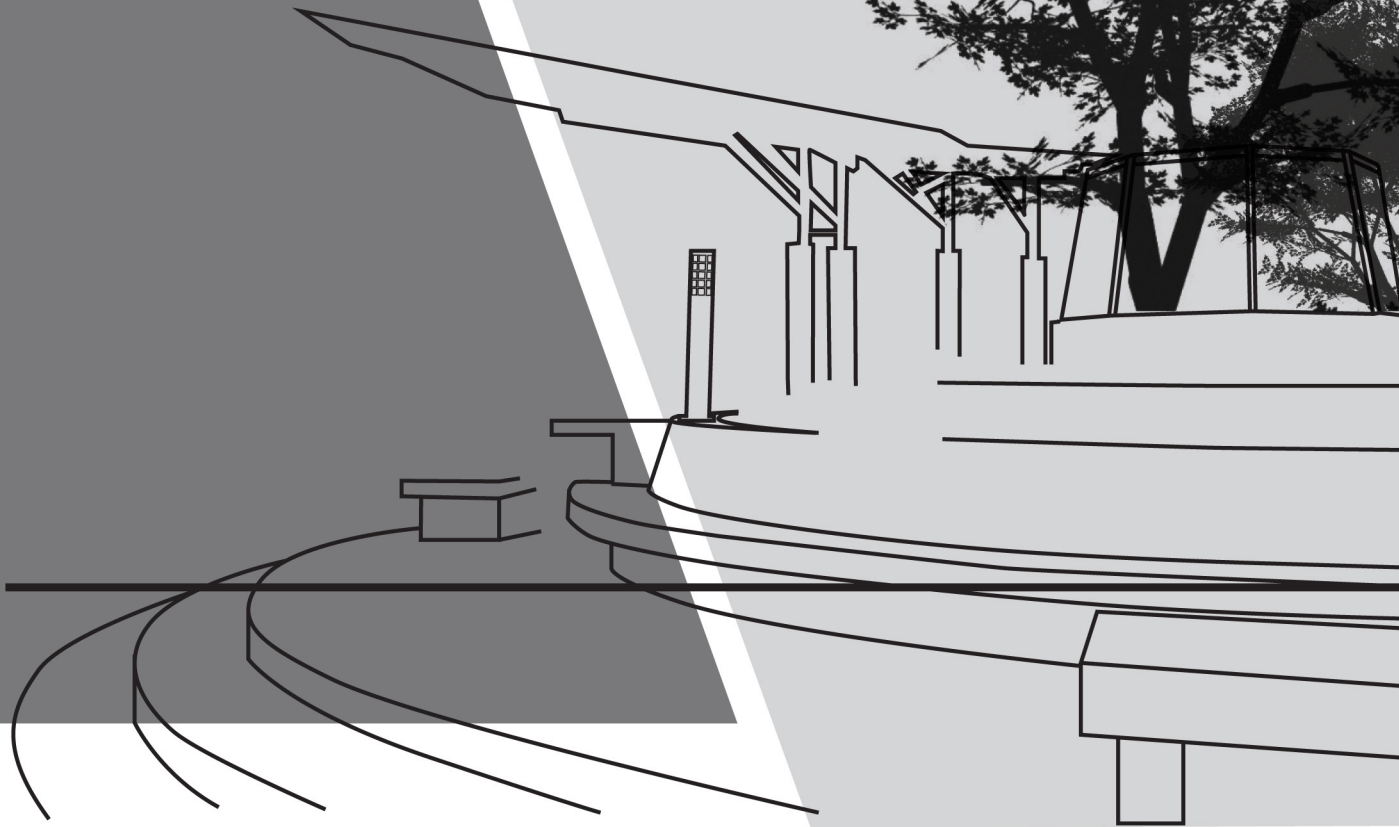
Syllabus: The nature of management strategy; Strategies in practice; Evaluation of external factors; Analysis of internal factors; Analysis of the strategies and options; Evaluation and control strategy; Quality management; Management strategy of global problems; Risk management; Business ethics; Corporate level strategy; Leadership strategies.

Prerequisite: None

Textbook:

1. David F.R. Friday, "Concepts of Strategic Management," 3rd Edition, Prentice Hall, 2010.
2. M.A. Hitt, R.D. Hoskisson, R.E., "Strategic Management: Concepts and Cases: Competitiveness and Globalization", 9th Edition, South-Western College Pub., 2010

DOCTORAL
PROGRAM



7. DOCTORAL PROGRAM

FTUI holds Doctoral Program for the six following study programs:

1. Civil Engineering
2. Mechanical Engineering
3. Electrical Engineering
4. Metallurgy & Material Engineering
5. Chemical Engineering
6. Architecture
7. Industrial Engineering

FTUI Doctoral program was officially opened in 2000 with the opening of the Civil Engineering and Electrical Engineering Doctoral program followed by the emersion of the Opto-electrotechnique and Laser Application study program into the Postgraduate Program of FTUI. The Mechanical Engineering study program was officially opened in 2006 while the Metallurgy & Material Engineering and Chemical Engineering followed in 2007. And In 2009, respectively Department of Architecture opened the Architecture Doctoral Program. In 2001, the Opto-electrotechnique and Laser Application was closed and was emerged into the Electrical Engineering study program. Each Doctoral study program is headed by the Head of Study Program which is held ex-officio by the Head of Department in the Faculty of Engineering UI. The Doctoral study programs have one or more focus subjects to give a more specific knowledge on engineering field to all students of the program.

Currently, the Doctoral Program is held in two ways: Lecture & Research; and Research.

New Students Selection

Selection process for new students for the FTUI Doctoral Program is as follow:

1. Pre-admission stage: future student is encouraged to informally contact their prospective Promotor or the Head of Department to further discuss his/her desired dissertation topic. This is important to make sure the availability of Promotor in accordance to said research topic. Communication may be done through email or face to face. The Head of Department and future Promotor then would discuss the student's proposal internally.
2. Future student should register online via <http://penerimaan.ui.ac.id> and complete the required documents and prerequisites.
3. Future student will then take the entrance examination (SIMAK UI) which consists of: (i) Academic Potential Examination and (ii) English Proficiency Test.
4. The results of the Entrance Examination will then be sent to FTUI by the UI Entrance Examination Committee. These results will then be discussed in a Department Committee Meeting headed by the Head of Department to determine which students accepted, and the proposed research topic approved, and the availability of future Promotor. An interview have to be arrange with the future student to determine the suitability of research topic, with previous study field, and the student's commitment to participate in the Doctoral program full time. Interview may be done directly or through email or messenger application.
5. The outcome of the Department Committee Meeting will then be submitted to the UI Entrance Examination Committee to be announced.

Academic Counseling

Since the day a student is registered as student for the Doctoral program until the time that he/she passes qualification examination, the student will be under the guidance of an academic advisor who the student expected to be their Promotor or Co-Promotor. Head of Department accepts a proposal of future Promotor/Academic Advisor from a committee in the Department. Once the student pass the qualification examination, the student will earn status as Doctor Candidate and the Academic Advisor's status will revert to Promotor/Co-Promotor.

Promotor and Co-Promotor

Promotor and Co-Promotor for Doctoral Program are lecturers or experts from related field and are assigned by Head of Department based on a Rector's Decree to guide and advise a Doctor candidate in

conducting research and dissertation writing. Academic Advisor consist of 1 Promotor and a maximum of 2 (two) Co-Promotors. Promotor is a first chair Advisor who holds an academic degree of Professor or Doctor and a minimum of Senior Lecture academic position; has a relevant expertise in the field which the student's dissertation topic is; and is acknowledge as a full time faculty at the Universitas Indonesia, and for the last five years has produced at the latest: one scientific paper in an accredited national journal or a reputable international journal; or one other form of scientific product which is acknowledge by a group of experts set up by the Academic Senate of Universitas Indonesia.

Co-Promotors are the Promotor's companions who act as second and/or third chair advisor who hold academic degree of Doctor or Senior Lecturer, and has a relevant expertise in the field with the student's dissertation topic. Co-Promotor from outside of the Faculty of Engineering UI must have the approval from the Promotor. Promotor and Co-Promotors are appointed by the Rector based on the proposal submitted by the Dean which are also based on suggestions from the Head of Department after the student has pass the qualification examination. The appointment must be done at the latest 1 (one) semester after the qualification examination. A change of Promotor/Co-Promotor must be proposed by the Dean to the Rector based on a proposal from the Head of Department.

Program Specification

1	Awarding Institution		Universitas Indonesia
2	Teaching Institution		Universitas Indonesia
3	Programme Title		Doctoral Program in Civil Engineering Doctoral Program in Mechanical Engineering Doctoral Program in Electrical Engineering Doctoral Program in Metallurgy & Material Engineering Doctoral Program in Chemical Engineering Engineering Doctoral Program in Architecture Doctoral Program in Industrial Engineering
4	Class		Regular
5	Final Award		Doctor (Dr.)
6	Accreditation / Recognition		Civil Engineering Doctoral Program: Accreditation A from BAN-PT Mechanical Engineering Doctoral Program: A Accreditation A from BAN-PT Electrical Engineering Doctoral Program: Accreditation A from BAN-PT Metallurgy & Material Engineering Doctoral Program: Accreditation A from BAN-PT Chemical Engineering Engineering Doctoral Program: Accreditation A from BAN-PT Architecture Doctoral Program: Accreditation B from BAN-PT Industrial Engineering Doctoral Program: On Accreditation Process
7	Language(s) of Instruction		Indonesia
8	Study Scheme (Full Time / Part Time)		Full Time
9	Entry Requirements		Master graduate from study programs in line with study program chosen and pass the entrance examination
10	Study Duration		Designed for 3 years
	Type of Semester	Number of semester	Number of weeks /semester
	Regular	6	14 - 17
	Short (optional)	none	none

11	<p>Streams:</p> <p><i>The Civil Engineering Doctoral Program has six streams as follow:</i></p> <ul style="list-style-type: none"> • <i>Structure</i> • <i>Construction Management</i> • <i>Transportation</i> • <i>Water Resource Management</i> • <i>Project Management</i> • <i>Geotechnique</i> <p><i>The Mechanical Engineering Doctoral Program has four streams as follow:</i></p> <ul style="list-style-type: none"> • <i>Energy Conversion</i> • <i>Engineering Design and Product Development</i> • <i>Manufacture Engineering</i> • <i>Fire Safety Engineering and Management</i> <p><i>The Electrical Engineering Doctoral Program has eight streams as follow:</i></p> <ul style="list-style-type: none"> • <i>Telecommunication Engineering</i> • <i>Electrical Power and Energy Engineering</i> • <i>Photonic and Electronic Engineering</i> • <i>Control Engineering</i> • <i>Multimedia and Information Engineering</i> • <i>Security of Information Network Engineering</i> • <i>Telecommunication Management</i> • <i>Electrical Power and Energy Management</i> <p><i>The Metallurgy & Material Engineering Doctoral Program has two streams as follow:</i></p> <ul style="list-style-type: none"> • <i>Corrosion and Protection</i> • <i>Material Engineering and Manufacture Process</i> <p><i>The Chemical Engineering Doctoral Program has five streams as follow:</i></p> <ul style="list-style-type: none"> • <i>Industry Catalist</i> • <i>Gas Management</i> • <i>Product Design and Chemical Process</i> • <i>Environmental Protection and Work Safety</i> • <i>Gas Technology</i> <p><i>The Industrial Engineering Doctoral Program has two streams as follow:</i></p> <ul style="list-style-type: none"> • <i>Rekayasa Kualitas Manufaktur</i> • <i>Rekayasa Sistem Jasa</i>
12	<p>Graduate Profiles:</p> <p>FTUI Doctoral Program Graduates has the capabilities of demonstrating expansion, novelty breakthrough in research in the engineering or architecture field in accordance to certain stream or sub-stream. The FTUI Doctoral Program prepares student to work in academic and research in accordance to their own stream; dedicate their expertise in research laboratory, industry or government institution; or create a business based on their innovation.</p> <p>Graduates are able to possess the following skill:</p> <ul style="list-style-type: none"> • Be able to show expertise in the engineering or architecture discipline; • Be able to uphold the academic and research ethics; • Be able to work collaboratively in research; • Be able to position themselves as leader in their community; • Be able to communicate well in their community and build networks; • Be able to demonstrate individual live skill in connection to human relationship; • Be able to demonstrate attitude, behavior and way of thinking which support their success in society.

13	Graduates Competence: The aim of Doctoral Program in FTUI is in line with the Doctoral Program of Universitas Indonesia, to produce quality graduates with the following competence:		
	<ol style="list-style-type: none"> 1. Able to independently update their knowledge on science and technology in engineering or architecture through research based innovation breakthrough. 2. Able to show professionalism in their field of study that can be accountable towards the development of science and technology. 3. Able to write a scientific paper in engineering or architecture and convey the result of their research to the public both orally or written in an international scientific activity. 4. Able to recommend a solution for a complex problem faced by society in the field of engineering or architecture through inter, multi and trans discipline approach. 5. Able to lead a working or research team to solve problem in the field of engineering or architecture that can be of benefit for the good of mankind. 6. Able to develop and maintain a network of cooperation with fellow researcher and research community in the field of engineering and architecture both in national and international level. 		
14	Classification of Subjects. (Course & Research)		
No	Classification	Credit Hours	Percentage
i	Course Component	18	34 %
ii	Research Component	34	66 %
	Total	52	100 %
14	Classification of Subjects. (Research)		
No	Classification	Credit Hours	Percentage
i	Course Component	0	0 %
ii	Research Component	52	100 %
	Total	52	100 %
15	Total Credit Hours to Graduate		52 CP

Curriculum Structure for FTUI Doctoral Program

The curriculum structure for the Doctoral Program in all study programs are the same, they are only differentiated by their codes for the research component. The code “xx” for each study programs are as follow:

ENCV for Civil Engineering, ENME for Mechanical Engineering, ENEE for Electrical Engineering, ENMT for Metallurgy & Material Engineering, ENAR for Architecture, and ENCH for Chemical Engineering.

The FTUI Doctoral Program is held in two program: Course and Research and Research.

1.1. DOCTORAL PROGRAM (COURSE & RESEARCH)

The following is the curriculum structure for Course & Research Doctoral Program in Table 1.
Table 1. The Curriculum Structure - Doctoral Program in Course and Research

KODE/CODE	MATA AJARAN	SUBJECT	SKS
	Semester 1	1st Semester	
ENGE900001	Metode Penelitian Lanjut	Advanced Research Method	6
EENE900001	Kekhususan 1	Special Subject 1	4
		Sub Total	10
	Semester 2	2nd Semester	
ENGE900002	Analisis Kualitatif & Kuantitatif	Qualitative & Quantitative Analysis	4
EENE900002	Kekhususan 2	Special Subject 2	4
EENE900004	Proposal Riset	Research Proposal	6
		Sub Total	14
	Semester 3	3rd Semester	
EENE900006	Publikasi - Konferensi Internasional	Publication - International Conference	4
		Sub Total	4
	Semester 4	4th Semester	
EENE900007	Ujian Hasil Riset	Research Result Examination	10
		Sub Total	10
	Semester 5	5th Semester	
EENE900008	Publikasi II - Jurnal Internasional	Publication II - International Journal	8
		Sub Total	8
	Semester 6	6th Semester	
EENE900010	Sidang Promosi	Sidang Promosi	6
		Sub Total	6
	Total		52

The Lecture Component includes four subjects:

- Advanced Research Method, 6 sks
- Qualitative and Quantitative Analysis, 4 sks
- Special Subject I, 4 SKS.
- Special Subject II, 4 SKS.

The Research Component includes:

- Research Proposal, 6 SKS
- Publication - International Conference, 4 SKS

3. Research Result Examination, 10 SKS
4. Publication - International Journal, 8 SKS
5. Promotion Exam, 6 SKS

1.2. DOCTORAL PROGRAM (RESEARCH)

The following is the curriculum structure for Research Doctoral Program in Table 2.

Table 2. The Curriculum Structure - Doctoral Program in Research

KODE/CODE	MATA AJARAN	SUBJECT	SKS
	Semester 1	1st Semester	
ENEE900003	Seminar Berkala Kelompok Ilmu	Research Group Periodic Seminar	8
		Sub Total	8
	Semester 2	2nd Semester	
ENEE900004	Proposal Riset	Research Proposal	6
		Sub Total	6
	Semester 3	3rd Semester	
ENEE900005	Publikasi I - Konferensi Internasional	Publication I - International Conference	4
		Sub Total	4
	Semester 4	4th Semester	
ENEE900007	Ujian Hasil Riset	Research Result Examination	10
		Sub Total	10
	Semester 5	5th Semester	
ENEE900008	Publikasi II - Jurnal Internasional	Publication II - International Journal	8
		Sub Total	8
	Semester 6	6th Semester	
ENEE900009	Publikasi III - Jurnal Internasional	Publication III - International Conference	8
ENEE900010	Sidang Promosi	Sidang Promosi	6
		Sub Total	14
Total			52

Description of Subjects**ENGE900001****ADVANCED RESEARCH METHOD****6 SKS**

Learning Objective(s): Course participants are expected to: (a) master the scientific work process based on science philosophy, which is the scientific justification aspects, innovative aspects and scientific ethics aspects, (b) able to write a research proposal and or draft of scientific writing related to the student's doctoral topic, (c) can map research result from the latest international journal in their field and understand the state-of-the-art from their research topic, and can determine the knowledge gap yet explored in the international level for further research in their Doctoral Program.

Syllabus: (1) Relationship between philosophy and engineering science; (2) Science Philosophy; (3) Epistemology in Engineering Science; (4) Research Method; (5) Problem formulation and hypothesis; (6) Research and state of the art; (7) Research Evaluation; (8) Design Evaluation and research Stages; (9) Introduction to the analysis of the data processing method; (10) Benchmark on research output and conclusion formulation; (11) Various citation method; (12) Finalization of research proposal draft and / or scientific article draft.

Prerequisite(s): None

Textbooks:

Haryono Imam R dan C. Verhaak, *Filsafat Ilmu Pengetahuan*, Gramedia, Jakarta, 1995

Willie Tan, "Practical Research Methods", Prentice Hall, 2002.

R. Kumar, *Research Methodology, A Step-by-step Guide for Beginner*, 3rd ed., Sage Pub, 2012

ENGE900002**QUALITATIVE AND QUANTITATIVE ANALYSIS****4 SKS**

Learning Objective(s): Discuss the qualitative and quantitative in data analysis and exploring specific data analysis areas. After participating in this subject which discuss the qualitative and quantitative approach in data analysis in exploring specific areas of data analysis. Students are expected to be able to build the following learning outcome: (1) awareness to situations requiring qualitative data analysis in the inductive paradigm; (2) awareness to situations requiring quantitative data analysis in the deductive paradigm; (3) appreciation toward various approaches; (4) possessing skills in giving critical appraisal; (5) possessing skills in performing qualitative and quantitative data analysis.

Syllabus: Introduction; Qualitative Analysis; Quantitative Analysis; Non-Parametric Analysis; Uncertainty Analysis; Critical Appraisal; Design of Experiment; ANOVA revisit; Multivariate Techniques.

Prerequisite(s): None

Textbooks:

Miles M & Huberman M, *Qualitative Data Analysis*, London Sage Publications, (1994)

Montgomery, D.C., & Runger, G.C, *Applied Statistics and Probability for Engineers 3rd Ed.*, John Wiley and Sons, Inc., New York, (2003)

Kirkup, L, *Experimental Method: An Introduction to the Analysis and Presentation*, John Wiley and Sons, Australia, Ltd., Queensland, (1994)

Montgomery, D.C, *Design and Analysis of Experiments 6th Ed.*, John Wiley and Sons, Inc., New York, (2005)

Hair, J.F., B.Black, B.Babin and R.E Anderson, *Multivariate Data Analysis 6th Ed.*, Pearson Education Inc., New Jersey, (2006)

ENEE900001**Special Subject 1****4 SKS****ENEE900002****Special Subject 2****4 SKS**

Special Subject 1 in the 1st first semester (4 SKS) and Special Subject 2 in the 2nd semester (4 SKS) are determined together with the student's Academic Advisor to support the student's research and/or to develop the student's knowledge with information and knowledge from unrelated field. Academic Advisor is also allowed to propose a special content for the student to Head of Department.

The following are the requirements for the implementation of Special Subject 1 and 2:

For students who do not have in line Master degree educational background from the Faculty of Engineering Universitas Indonesia, they are allowed to take the similar courses of the related field of study available at the Master Program in FTUI during the running semester.

Students are also allowed to take courses from other study programs within the Faculty of Engineering Universitas Indonesia or courses from other faculties in UI as stated in the Guidance Book or the Master/Doctoral Program Catalog.

Students are allowed to take classes in other Master Program in the Faculty of Engineering Universitas Indonesia or other faculties within the Universitas Indonesia as deemed necessary by their Academic Advisor

In the event where neither conditions is viable for the students, the Academic Advisor is allowed to conduct a class of said course.

ENEE900003

Research Group Periodic Seminar

8 SKS

Research Group Periodic Seminar is an early activity of research in the Doctoral Program in Research where students conduct literature study in relation to the materials for their research. This literature study must be done intensively by mapping out the research results from the latest international journals in related field. The final aim was so that students have a state-of-the-art understanding of their research topic, and can determine the knowledge gap previously unexplored in the international level for further research in their Doctoral Program. The result of this literature study is compiled in a literature study report presented in the Research Group Periodic Seminar to be examined by a panel comprises of future Promoter/ Academic Advisor and Examiners from related field of study. Students will passed this Research Group Periodic Seminar if they received a minimum grade of B.

ENEE900004

Research Proposal

6 SKS

Research Proposal is the continuous activity of the literature study, where after gaining a state-of-the-art knowledge of their research topic, students can formulize the scope of their Doctoral research and determine which research method will be use. The result of this activity is a comprehensive research proposal which include: goals, background and data analysis from early study or experiments done. Included in this research proposal is plan of work for each semester and its publication goals. At this level, it is expected for students to begin experiment activity or early study which can show the direction of their research is feasible and recent in his field. The early experiment or study result, the literature study and the whole research plan is then compiled in a Research Proposal Report to be presented and examined in a Research Proposal Examination. Students will passed this Research Proposal if they received a minimum grade of B.

ENEE900007

Research Output Examination

10 SKS

At this stage, students are expected to have a research output with a minimum of 75% from their research plan. Doctorate candidate are expected to have reach a research outcome which is the main part of the originally planned contribution. The outcome of this research is measured through the Research Output Examination. The examination committee is appointed through the Dean's Decree based on the Head of Department's proposal. These examiners consist of experts related in the field of study of the Doctorate candidate with at least one examiner from an institution outside of Universitas Indonesia. Doctor Candidate will passed this Research Output Examination if they received a minimum grade of B. At this stage, a Doctor Candidate are allowed to design a scientific article framework to be published in an indexed International Journal and determine which International Journal they will send the article to.

ENEE900006**Publication - International Conference****4 SKS****ENEE900005****Publication I - International Conference****6 SKS**

At this stage, students are expected to have an experiment result or study to focused on in their research topic and clarify their research direction. The result of the experiment must also show innovation or breakthrough, mastery of knowledge on their stream in relation to their research topic, the depth of their research materials, and the mastery of the state of the art development in their field or research interest, originality, and the contribution towards science and/or its implementation. Once presented in front of their promoter and co-promoter, the whole research result at this stage will be deemed worthy for international conference publication.

ENEE900008**Publication II - International Journal****8 SKS****ENEE900009****Publication III - International Journal****8 SKS**

The scientific publication is an integral part of research activity and a prerequisite in participating in a Promotion Examination. International Journal meant here is an English language journal which its editorial board consists of member from at least three different countries or more. A mandatory publication must have an "Accepted" status before the Promotion Examination. FTUI itself publish their own international journal, the International Journal of Technology (IJTech), which students can utilize as one of the international journal to publish their Doctoral research.

ENEE900008**Promotion Examination****6 SKS**

Before deemed fit to participate in a Promotion Examination. Doctor Candidate are required to conduct additional research as a follow up from the Research Output Examination. The inputs and revisions given during the Research Output Examination must be completed and revised through a series of final research. At this stage, the Doctor Candidate must prove the authenticity and originality of their research as new contribution to the scientific world. Thus, at this stage, the Doctor Candidate is required to have an "Accepted" for their international Journal, they are also required to complete their dissertation paper ready to be tested during the Promotion Examination.

Dissertation is an academic scientific paper study output and/or in depth research done independently and contained new contribution to issues that are temporary already known the answer or new questions ask on issues that are seen to have been established in the field of science and technology by the Doctor Candidate under the guidance of his Academic Advisor. A Doctor Candidate that has completed the revision of their dissertation are required to submit a completed version of their dissertation in five hard cover books and original approval form that has been signed by their advisors and submitted to PAF FTUI signifying the end of their study. The format for writing and binding the Dissertation should follow the writing and binding guidelines in the Technical Guidelines of Final Project Writing for Students of

Universitas Indonesia that can be downloaded at <http://www.ui.ac.id/download>.

Promotion Examination is a scheduled academic activity as a medium of evaluation for the Doctor Candidate Dissertation as a requirement to obtain the highest academic title, Doctor. The requirements and provision for Promotion Examination are as follow:

- Promotion Examination can be done if all the scientific publication requirements are completed by the Doctor Candidate: a minimum of one publication in an International Scientific Journal (in “Accepted” status) in relation to their dissertation research. The Publication is required to state Faculty of Engineering Universitas Indonesia as one of the affiliation institution.
- Promoter and Co-Promoter gave a written approval on the dissertation as a sign that the dissertation can move forward to the Promotion Examination.
- The Promotion Examination is carried out by the Committee of Promotion Examination which is appointed with a Rector’s Decree based on a proposal from the Head of Department and the Dean of the Faculty of Engineering Universitas Indonesia.
- The Committee of the Promotion Examination comprises of: (a) Promoter and Co-Promoter, (b) The Examiners, (c) a minimum of one examiner from outside of Universitas Indonesia.
- Examiners consist of experts from related field of study. In a special circumstances, an expert that is not from the academic community can be invited as part of the examiners team.
- The Promotion Examination is led by the Head of the Examiners Committee that is also a member of the committee outside of the Promoter/Co-Promoter and outside examiner. If the Head of the Examiners Committee is unavailable, his/her position can be replaced by one of the member of the examiner team.
- The Promotion Examination is held as an open session for a period of maximum three hours divided into two stages: the dissertation presentation given by the Doctor Candidate for 15-30 minutes and a question and answer session for 120-165 minutes.
- The Doctor Candidate will pass the Promotion Examination if they received a minimum grade of B with GPA 3.00.

Facilities for Doctoral Program Students

To make sure that student of FTUI Doctoral Program are able to conduct full time research and produce excellent publications as required, FTUI provides the following facilities:

Doctoral Program Students’ Workstation

Compact cubicles in comfortable rooms are available as Doctoral program students’ workstation. The locations for these workstations are located on the 2nd and 3rd floor of the Engineering Center Building. Access to these workstations requires a swipe card to guarantee security. A round the clock wi-fi service is also available. To procure a workstation and access card, students are requested to register to the Associate Dean for General Affairs in the Dean’s building, 2nd floor, FTUI Depok.

International Journal Article Writing Training

These free of charge trainings for the FTUI Doctoral program students are held several times each year. The information regarding these trainings are communicated through an announcement in SIAK-NG, posters at each Department, Doctoral program mailing list and FTUI website (www.eng.ui.ac.id).

Research Proposal Writing Training

These free of charge trainings for the FTUI Doctoral program students are held several times each year. The information regarding these trainings are communicated through an announcement in SIAK-NG, posters at each Department, Doctoral program mailing list and FTUI website (www.eng.ui.ac.id).

Line Editing Draft for International Journal Article

FTUI provides funds for line editing drafts for International Journal Articles. Requirement for applying for this funds are: the article must include the promoter name as part of the writing team and state FTUI as the main affiliation. To be grant this facility, students only needs to send a draft of their article through email to the FTUI Associate Dean of Academic and Research (risetft@eng.ui.ac.id). The time required for line editing is 2-4 weeks.

Doctoral Program Mailing-List

The Doctoral Program mailing list is used as a communication tool between the Dean's Faculty Heads, the Faculty Center Administration staff and all Doctoral program students in FTUI. Information regarding trainings, seminars, grants or other academic matters is announced through this mailing list. Complaints and suggestions are also accommodated by this mailing list. The mailing list address is: programdokterft@group.eng.ui.ac.id

Research and Incentive Grants for Master and Doctoral Program

Research funds including consumables and tests for research as part of the thesis and dissertation writing is the responsibility of the student. There are a number of competitive research grants, incentive research grant schemes available from which Master and Doctoral program students may propose to finance his/her research. Complete guidance and research proposal examples are available at the Associate Dean for Research and Community Development secretary at the Dean's Building, 2nd floor or through <http://research.eng.ui.ac.id>.

International Journal Writing Incentive

This incentives are given to lecturer of State of Private Universities that have published an article in an international journal. Each proposer must be the first writer of the article and include an institution affiliation in Indonesia.



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