

STRUKTUR KURIKULUM S1 TEKNIK KOMPUTER

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 Selektika 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

ELECTIVE COURSES

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

Silabus Mata Ajar

Silabus Mata Kuliah pada Program Studi Teknik Komputer berdasarkan kemunculan dalam struktur kurikulum:

UIGE600002**MPKT B**

6 SKS

Lihat Silabus Teknik

ENGE600007**FISIKA LISTRIK, MGO**

3 SKS

Lihat Silabus Teknik

ENGE600008**PRAK. FISIKA LISTRIK, MGO**

1 SKS

Lihat Silabus Teknik

ENGE600003**KALKULUS**

4 SKS

Lihat Silabus Teknik

ENGE601001**DASAR SISTEM DIGITAL + P**

3 SKS

Capaian Pembelajaran: Dalam kuliah ini, mahasiswa akan mempelajari semua tahapan perancangan dan implementasi dari sebuah sistem digital. Setelah mengikuti kuliah ini, mahasiswa akan mampu menganalisis rangkaian sistem digital sederhana, dan mampu membuat rancangan sistem digital menggunakan blok kombinasional dan sekuensial sederhana. Kuliah ini juga melibatkan beberapa kegiatan praktikum di laboratorium untuk melakukan desain, implementasi dan verifikasi sistem logika digital. Beberapa perangkat keras dan perangkat lunak simulasi untuk rangkaian digital akan digunakan

Topik: Prinsip Aljabar Boolean dan aplikasinya; Interface Logic Families; Number System & Data Encoding; Basic Logic Circuits; Basic Modular Design of Combinational Circuits; Basic Modular Design of Sequential Circuits.

Praktikum: Modul 1 - Pengantar dan Pengenalan Dasar Rangkaian Digital, Modul 2 - Aljabar Boolean dan Gerbang Logika Dasar, Modul 3 - Karnaugh Map, Modul 4 - Gerbang Logika Kompleks, Modul 5 - Dekoder dan Encoder, Modul 6 - Multiplexer dan Demultiplexer, Modul 7 - Rangkaian Aritmatika Digital, Modul 8 - Flip-Flop dan Latch, Modul 9 - Register dan Counter, Modul 10 - Proyek Praktikum Dasar Sistem Digital

Prasyarat: tidak ada.

Buku Ajar:

1. M. Morris R. Mano, Charles R. Kime, Tom Martin, Logic & Computer Design Fundamentals, 5th ed, Prentice Hall, 2015
2. Ronald J. Tocci, Neal S. Widmer, and Gregory L. Moss, Digital Systems: Principles and Applications, 11th Ed., Prentice Hall, 2010
3. Modul Praktikum Dasar Sistem Digital

UIGE600003**BAHASA INGGRIS**

3 SKS

Lihat Silabus Teknik

UIGE600001**MPKT A**

6 SKS

Lihat Silabus Teknik

UIGE600010 - UIGE600015**AGAMA**

2 SKS

Lihat Silabus Teknik

UIGE600020 - UIGE600048**OLAH RAGA/SENI**

1 SKS

Lihat Silabus Teknik

ENGE600002**ALJABAR LINIER**

4 SKS

Lihat Silabus Teknik

ENGE600005**FISIKA MEKANIKA & PANAS**

3 SKS

Lihat Silabus Teknik

ENGE600006**PRAK. FISIKA MEKANIKA & PANAS**

1 SKS

Lihat Silabus Teknik

ENGE602002**PENGANTAR TEKNIK KOMPUTER + P**

3 SKS

Capaian Pembelajaran: Kuliah ini merupakan sebuah pengantar pada dunia teknik komputer. Pada kuliah ini akan dibahas dasar-dasar yang dibutuhkan dalam pendidikan teknik komputer. Setelah mahasiswa mengikuti kegiatan mata kuliah ini, maka mahasiswa akan mampu menjelaskan perangkat yang terdapat dalam sistem komputer baik perangkat keras maupun perangkat lunaknya. Melalui kuliah ini, mahasiswa juga akan mampu merancang algoritma sederhana dalam *pseudocode* dan dapat mengimplementasikan algoritma tersebut dalam program dengan menggunakan bahasa pemrograman tertentu.

Topik: Pengenalan Komputer, Pengenalan Perangkat Keras Komputer, Pengenalan Perangkat Lunak Komputer, Algoritma, *Pseudocode*, Pengenalan bahasa C, Pengendalian program dalam bahasa C, Program terstruktur dalam bahasa C.

Praktikum: Modul 1 - Pengantar Praktikum Pengantar Teknik Komputer, Modul 2 - Perangkat Keras Komputer, Modul 3 - Perangkat Lunak Komputer, Modul 4 - Modul Diagram Alir, Modul 5 - *Pseudocode*, Modul 6 - Dasar Pemrograman Bahasa C, Modul 7 - Percabangan Bahasa C, Modul 8 - Perulangan Bahasa C, Modul 9 - Proyek Pemrograman Bahasa C

Prasyarat: Dasar Sistem Digital

Buku Ajar:

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.

ENGE603003**MATEMATIKA TEKNIK**

4 SKS

Lihat Silabus Teknik Elektro

ENGE603004**DASAR RANGKAIAN ELEKTRONIKA**

2 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa akan mempelajari komponen-komponen serta rangkain dasar elektronika. Setelah mengikuti mata kuliah ini mahasiswa mampu menjelaskan properti material dan cara kerja komponen elektronika dasar, seperti diode, transistor, op-amp, filter dan sebagainya.

Topik: Electronics Materials, diodes, and bipolar transistor; MOS transistor circuit, timing, and power; Storage cell

Architecture; Operational Amplifiers

Prasyarat: Fisika Listrik, Magnet, Optik dan Gelombang

Buku Ajar:

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

ENCE603005

RANGKAIAN LISTRIK

2 SKS

Capaian Pembelajaran: Kuliah ini bertujuan untuk memperkenalkan kepada mahasiswa mengenai dasar rangkaian listrik. Setelah mengikuti kuliah ini mahasiswa akan mampu menganalisis rangkaian listrik dan elektronika sederhana menggunakan teknik yang sesuai. Mahasiswa diharapkan dapat menganalisis rangkaian resistif, AC dan DC yang menjadi komponen dasar dalam teknik elektro.

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

Prasyarat: Fisika Listrik, Magnet, Optik dan Gelombang

Buku Ajar:

1. D.E. Johnson, J.R. Johnson, et.all., "Electric Circuit Analysis", 3rd Edition, Prentice Hall International, Inc., 1997, (Chapter 1-9).
2. J. W. Nilsson, S.A. Riedel, "Electric Circuits", 10th Edition, Prentice Hall International Inc., 2014.

ENCE603006

PRAKT. RANGKAIAN LISTRIK DAN ELEKTRONIK

1 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa mempelajari secara praktik komponen-komponen serta rangkain dasar elektronika dan rangkaian listrik. Setelah mengikuti praktikum ini, mahasiswa mampu menganalisis cara kerja rangkaian listrik dan elektronika sederhana menggunakan teknik yang sesuai

Topik: Modul 1 - Pengenalan; Modul 2 - Dioda; Modul 3 - BJT Amplifier; Modul 4 - FET Amplifier; Modul 5 - Op-Amp Amplifier; Modul 6 - Filter; Modul 7 - Dasar Kelistrikan; Modul 8 - Linearitas Analisa Mesh dan Simpul; Modul 9 - Analisis Superposisi Thevenin dan Norton;

Prasyarat: Fisika Listrik, Magnet, Optik dan Gelombang, Rangkaian Listrik, Dasar Rangkaian Elektronika

Buku Ajar:

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, et.all., "Electric Circuit Analysis", 3rd Edition, Prentice Hall International, Inc., 1997, (Chapter 1-9).
3. J. W. Nilsson, S.A. Riedel, "Electric Circuits", 10th Edition, Prentice Hall International Inc., 2014.
4. Modul Praktikum Rangkaian Listrik dan Elektronik

ENCE603007

ALGORITMA

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa mempelajari cara mengevaluasi algoritma. Setelah mengikuti kuliah ini, mahasiswa akan mampu menjelaskan dasar analisis algoritma; mampu menjelaskan algoritma klasik; mampu mengevaluasi algoritma berdasarkan kompleksitasnya

Topik: Dasar analisis algoritma; Strategi algoritma; Algoritma klasik untuk tugas umum; Analisis dan desain algoritma untuk aplikasi khusus Algoritma parallel dan multi-threading; Kompleksitas algoritma

Prasyarat: Pemrograman Lanjut

Buku Ajar:

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

ORGANISASI DAN ARSITEKTUR KOMPUTER

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai arsitektur dan organisasi dari sistem komputer. Setelah mengikuti mata kuliah ini mahasiswa akan mampu membedakan makna organisasi komputer dan arsitektur komputer, mampu menganalisis arsitektur komputer, khususnya desain instruksi-set, korelasi antara *clock-speed* dan kinerja CPU dan pengaruh struktur *bus* untuk kecepatan komputasi, mampu menguraikan peran memori cache dalam meningkatkan waktu akses memori, termasuk organisasinya dan metode *updates*. Mahasiswa juga akan mampu mengembangkan program-program kecil menggunakan set instruksi dasar dari *hypothetical processor*. Mahasiswa juga akan mampu menguraikan pengaruh teknik pemrograman untuk kecepatan komputasi. Mahasiswa juga akan mampu menganalisis desain prosesor canggih dalam meningkatkan komputasi kinerja seperti pipelining, prosesor paralel dan prosesor multicore.

Topik: Dasar Instruction set architecture; Organisasi Prosesor; Memory; Peripheral subsystems; Multi-many core architectures; Pipelining

Prasyarat: Pengantar Teknik Komputer dan

Buku Ajar:

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

ENCE603009

STRUKTUR DISKRIT

3 SKS

Capaian Pembelajaran: Pada kuliah ini mahasiswa akan mempelajari prinsip-prinsip dasar matematika diskrit dan menerapkannya untuk memeriksa dan mempelajari teknik-teknik komputasi modern dan membangun landasan untuk menganalisis masalah dalam teknik komputer dan mengembangkan solusi. Setelah mengikuti kuliah ini, mahasiswa akan mampu membuat set dan fungsi, menerapkan teknik pembuktian serta, mampu menggunakan teori graph, tree, iterasi dan rekursi dalam berbagai kasus permasalahan di bidang teknik komputer

Topik: set; fungsi; relasi; aljabar boolean; teknik pembuktian; dasar pembuktian; graph; tree; iterasi; rekursi

Prasyarat: Tidak ada.

Buku Acuan:

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

ANALISIS VEKTOR DAN PEUBAH KOMPLEKS

2 SKS

Lihat Silabus Teknik Elektro

ENCE604011

SINYAL DAN SISTEM

3 SKS

Lihat Silabus Teknik Elektro

ENCE604012

PEMROGRAMAN LANJUT

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dipelajari mengenai pemrograman menggunakan bahasa tingkat tinggi. Setelah mengikuti kuliah ini diharapkan mahasiswa mampu mengimplementasikan pemrograman modular dalam bentuk fungsi (by value dan by reference); mampu mengimplementasikan algoritma rekursi ke dalam bahasa C; mampu menggunakan array dalam program C; mampu membuat program dengan struktur data; mampu membuat program dengan struktur data dinamis.

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

Prasyarat: Pengantar Teknik Komputer dan Praktikum

Buku Ajar:

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

ENCE604013

PERANCANGAN SISTEM DIGITAL + P

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai prinsip-prinsip dalam merancang sistem digital. Setelah mengikuti kuliah ini diharapkan mahasiswa mampu mendesain dan menganalisis rangkaian sekuen-sial dan rangkaian kombinasional dengan menggunakan bahasa pemodelan hardware definition language (HDL) dan mampu melakukan sintesis ke dalam perangkat PLD seperti CPLD dan FPGA.

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

Prasyarat: Dasar Sistem Digital + P

Buku Ajar:

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. Modul Praktikum Perancangan Sistem Digital

ENCE604014**SISTEM BERBASIS KOMPUTER**

4 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai teknologi mikroprosesor dan mikrokontroler. Setelah mengikuti mata kuliah ini diharapkan mahasiswa mampu melakukan proses antarmuka ke alat I/O; mampu membuat program sederhana dalam bahasa Assembly untuk sistem embedded; mampu merancang sistem embedded sederhana menggunakan mikrokontroler

Topik: Pengenalan sistem komputer, mode pengalamatan, data transfer, pemrograman mikroprosesor dengan Bahasa Assembly, antarmuka memory, pengenalan sistem berbasis komputer, pemrograman Input/Output, interrupt handling, timer

Prasyarat: Organisasi Arsitektur Komputer

Buku Ajar:

1. Brey, Barry B, The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro 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**PRAKTIKUM SISTEM BERBASIS KOMPUTER**

1 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa akan mempelajari secara praktek cara memprogram mikroprosesor dan mikrokontroler serta merangkai sistem embedded berbasis mikrokontroler. Setelah mengikuti praktikum ini diharapkan mahasiswa mampu melakukan proses antarmuka ke alat I/O, mampu membuat program sederhana dalam bahasa Assembly untuk sistem embedded dan mampu merancang sistem embedded sederhana menggunakan mikrokontroler 8051 dan ARM

Topik: Modul 1- Pengantar Praktikum Mikroprosesor & Mikrokontroler, Modul 2 - Pemrograman Mikroprosesor dengan Bahasa Assembly, Modul 3 - Modul Instruksi Program Kontrol, Modul 4 - Procedure dan Macro, Modul 5 - Proyek Mikroprosesor, Modul 6 - Pemrograman Mikrokontroler dengan Bahasa Assembly, Modul 7 - Subrutin, Modul 8 - Input/Output, Modul 9 - Pengenalan Pemrograman Mikrokontroler dengan Bahasa C, Modul 10 - Proyek Mikrokontroler

Prasyarat: Sistem Berbasis Komputer

Buku Ajar:

1. Modul Praktikum Sistem Berbasis Komputer, Laboratorium Digital Departemen Teknik Elektro
2. Brey, Barry B, The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro 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**JARINGAN KOMPUTER DAN PRAKTIKUM**

4 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa mempelajari topik-topik mengenai jaringan komputer yang dibahas secara komprehensif dari layer 1 hingga layer 7. Setelah mengikuti kuliah ini, mahasiswa akan mampu menerapkan berbagai protokol TCP/IP dan teknologi jaringan ethernet serta pengalamatan yang tepat dalam jaringan sederhana, mampu mengimplementasikan jaringan sederhana berbasis VLAN dan menerapkan berbagai routing

protokol seperti static routing, RIP, Single Area OSPF serta memanfaatkan Access Control List, DHCP dan NAT untuk mendukung kemampuan jaringan, dan mampu menerapkan fitur akses kontrol dasar dalam jaringan komputer dan mampu memanfaatkan konsep pengalamatan dinamis dan menerapkan network address translation dalam jaringan komputer sederhana

Topik: arsitektur dan topologi jaringan, protokol dan komunikasi jaringan; OSI dan TCP/IP Layer; teknologi jaringan akses pada LAN dan WAN; teknologi ethernet; network layer; IP Address & Subnetting; network transport dan application protocol; Dasar switched networks; VLAN & InterVLAN; Konsep routing static & dinamik; Routing Protokol RIP; Single Area OSPF; Access Control List Standard & Extended; DHCP Server, Client, & Relay, Static & Dynamic NAT

Prasyarat: Pengantar Teknik Komputer + P

Buku Ajar:

1. A. Tanenbaum, "Computer Networks", Prentice Hall, 5th Eds, 2010
2. CISCO Networking Academy Program: Network Fundamentals, CCNA Exploration ver 4, <http://cisco.netacad.net>

ENCE605017

PROBABILITAS DAN PROSES STOKASTIK

3 SKS

Lihat Silabus Teknik Elektro

ENCE605018

REKAYASA PERANGKAT LUNAK

3 SKS

Capaian Pembelajaran: Pada kuliah ini, mahasiswa akan mempelajari cara merancang perangkat lunak dengan tahapan yang benar dan mampu mendokumentasikannya. Setelah mengikuti kuliah ini, mahasiswa akan mampu membuat rancangan perangkat lunak menggunakan tahapan software life cycle yang benar dengan tingkat risiko yang diinginkan, mampu membuat rancangan perangkat lunak dengan tahapan yang benar; mampu mendokumentasikan tahapan rancangan perangkat lunak

Topik: 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, sustainability, manufacturability

Prasyarat: Pemrograman Lanjut

Buku Acuan:

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

SISTEM EMBEDDED 1

2 SKS

Capaian Pembelajaran: Pada mata kuliah ini, mahasiswa belajar membuat rancangan sistem tertanam (perangkat keras dan perangkat lunak) untuk aplikasi khusus. Setelah mengikuti mata kuliah ini mahasiswa mampu membuat rancangan sistem embedded dengan sensor dan aktuator secara sinkron dan asinkron

Topik: Characteristics of embedded systems; Asynchronous and synchronous serial communication; Data acquisition, control, sensors, actuators

Prasyarat: Sistem Berbasis Komputer, Rangkaian Listrik, Dasar Rangkaian Elektronika

Buku Ajar:

1. Lee & Seshia, "Introduction to Embedded Systems - A Cyber-Physical Systems Approach", 2nd edition, UC-Berkeley, 2015

ENCE605020

SISTEM OPERASI

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai prinsip dasar sistem operasi generasi awal dan terkini. Setelah mengikuti kuliah ini mahasiswa akan mampu menjelaskan sistem pengelolaan sumber daya sistem komputer, mampu menjelaskan teknik-teknik manajemen memori; mampu menjelaskan teknik-teknik manajemen penyimpanan data; mampu menjelaskan teknik-teknik manajemen sumber daya komputer; mampu menjelaskan arsitektur distributed systems

Topik: Operating Systems Structures; Process; Thread; CPU Scheduling; Concurrency; Memory-system management, storage management; distributed system architectures

Prasyarat: Organisasi Arsitektur Komputer

Buku Ajar:

8

1. Abraham Silberschatz, “Operating System Concepts”, 9th Ed., Dec. 17, 2012
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Pearson, Mar. 20, 2014

ENCE605021**DESAIN DAN MANAJEMEN JARINGAN KOMPUTER DAN PRAKTIKUM**

4 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dipelajari cara merancang jaringan dengan skala yang lebih besar dengan mempertimbangkan aspek skalabilitas dan reliabilitas. Setelah mengikuti mata kuliah ini mahasiswa akan mampu mengimplementasikan berbagai teknik LAN redundancy dan Link Aggregation untuk meningkatkan skalabilitas dan reliabilitas jaringan, mampu menggunakan OSPF dan EIGRP Routing protokol dalam skala jaringan yang lebih besar, serta mampu mendesain jaringan WAN dan Internet serta menerapkan prinsip dan prosedur manajemen jaringan

Topik: Skalabilitas Jaringan; LAN redundancy; Link Aggregation; Wireless LAN; OSPF Multiaccess dan Multiarea; EIGRP. Hierarchical Network Design; WAN technologies; Koneksi Point to Point dan Frame Relay; Solusi Broadband; Internet VPN; Network Monitoring; Troubleshooting the networks; Network performance evaluation. **Proyek:** Perancangan jaringan komputer pada suatu organisasi perusahaan.

Prasyarat: Jaringan Komputer + P

Buku Ajar:

1. CISCO Networking Academy Program: Network Fundamentals, CCNA Exploration ver 4, <http://cisco.netacad.net>
2. James D. McCabe, “Analisis Jaringan, Arsitektur dan Desain”, 3rd Edition, Morgan Kaufmann, 2007.

ENCE605022**SISTEM BASIS DATA DAN PRAKTIKUM**

3 SKS

Capaian Pembelajaran: Pada kuliah ini, mahasiswa akan mempelajari konsep-konsep sistem basis data dan aplikasinya. Setelah mengikuti kuliah ini, mahasiswa mampu merancang basis data terstruktur dalam perancangan perangkat lunak dan mengimplementasikannya ke dalam sistem basis data SQL

Topik: Database systems; Event-driven and concurrent programming; Using application programming interfaces

Prasyarat: Struktur Diskrit

Buku Acuan:

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, 2011.

ENCE607031**PENULISAN ILMIAH**

2 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa akan mempelajari cara membuat proposal dan makalah ilmiah untuk dipublikasikan. Setelah mengikuti kuliah ini mahasiswa akan mampu menulis karya ilmiah dengan struktur yang baik, mampu menggunakan bahasa Indonesia dan Bahasa Inggris dalam penulisan ilmiah, dan mampu menggunakan perangkat lunak untuk menulis karya ilmiah dengan format yang baik.

Topik: sistematika penulisan ilmiah; experimental variables and set up; statistical analysis tools; Penggunaan bahasa Indonesia yang baik dalam karya ilmiah; Penggunaan bahasa Inggris dalam karya ilmiah; word processing software; styling; referencing tools

Prasyarat: tidak ada

Buku Ajar:

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**JARINGAN TELEKOMUNIKASI**

3 SKS

Capaian Pembelajaran: Pada kuliah ini akan dibahas mengenai sistem jaringan telekomunikasi. Setelah mengikuti kuliah ini mahasiswa akan mampu menjabarkan prinsip dan metode dasar teknik telekomunikasi serta penggunaan perangkat telekomunikasi dalam sistem jaringan, mampu menjabarkan teknik-teknik modulasi dan multiplexing; mampu menjelaskan fungsi perangkat telekomunikasi dalam sistem jaringan

Topik: Pengantar Teknik Telekomunikasi; Teknik Modulasi (Amplitudo dan frekuensi); Modulasi Digital; Teknik Multiplexing; Coding; Sistem Teleponi; Teknologi perangkat telekomunikasi

Prasyarat: Sinyal dan Sistem

Buku Ajar:

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**KEAMANAN JARINGAN KOMPUTER DAN PRAKTIKUM****3 SKS**

Capaian Pembelajaran: Pada mata kuliah ini akan dipelajari teknik-teknik keamanan dalam jaringan komputer. Setelah mengikuti kuliah ini mahasiswa mampu menganalisis dan mengimplementasikan aspek keamanan pada jaringan komputer, mampu menganalisa keamanan dan integritas data serta melakukan proteksi, mampu menerapkan teknik-teknik autentikasi dan kriptografi dalam keamanan jaringan dan web.

Topik: Keamanan dan Integritas Data; Vulnerabilities; Resource Protection; Private & Public Key Kriptografi; Autentikasi; Network and Web Security.

Prasyarat: Desain dan Manajemen Jaringan Komputer + P

Buku Ajar:

1. W. Stallings, "Network Security Essentials: Application and Standards, 5/E, Prentice Hall, 2013.
2. R.R.Panko, Corporate Computer and Network Security, Prentice-Hall, 2004
3. M.E.Whitman and H.J.Mattord, Principles of Information Security, Thomson Course, 2003

ENCE606026**SISTEM EMBEDDED 2 DAN PRAKTIKUM****3 SKS**

Capaian Pembelajaran: Pada mata kuliah ini, mahasiswa belajar mengoptimalkan sumber daya dalam sistem embedded yang meliputi CPU, memory dan sumber daya lainnya. Setelah mengikuti kuliah ini mahasiswa akan mampu membuat rancangan sistem embedded lanjut dengan memperhatikan hemat daya energi dan keperluan mobile dan networking

Topik: Periodic interrupts, waveform generation, time measurement; Implementation strategies for complex embedded systems; Techniques for low-power operation; Mobile and networked embedded systems.

Prasyarat: Sistem Embedded 1, Sistem Operasi, Perancangan Sistem Digital + P

Buku Ajar:

1. Sam Siewer & John Pratt, Real-Time Embedded Components and Systems with Linux and RTOS, 2nd ed., Mercury Learning, 2015

ENCE606027**PROFESIONALISME DAN ETIKA DALAM TEKNOLOGI INFORMASI****2 SKS**

Capaian Pembelajaran: Pada kuliah ini, mahasiswa akan mempelajari konsep profesionalisme dan etika dalam bidang teknologi informasi. Setelah mengikuti kuliah ini, mahasiswa mampu menjabarkan issue terkini dalam kode etik IT; mampu mengelaborasi etika profesional, peran dari organisasi profesional terhadap para anggotanya; mampu menjelaskan klasifikasi pekerjaan terkini dalam bidang IT dan sertifikasi profesional bidang IT; mampu menjabarkan pentingnya kode etik profesi dan dampaknya terhadap masyarakat luas; mampu menjelaskan tanggung jawab sosial dalam bidang IT; mampu menerapkan konsep profesionalisme dan etika pada kasus tertentu

Topik: Etika; Job, Profesi dan Profesional; Profesi dalam teknologi informasi; organisasi dan kode etik ahli IT; etika cyber; hak cipta intelektual; kejahatan Internet

Prasyarat: Tidak ada.

Buku Acuan:

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**PEMROGRAMAN BERORIENTASI OBJEK DAN PRAKTIKUM****3 SKS**

Capaian Pembelajaran: Pada kuliah ini akan dipelajari cara membuat program dengan konsep berorientasi objek. Setelah mengikuti kuliah ini mahasiswa mengimplementasikan rancangan perangkat lunak ke dalam bahasa pemrograman berorientasi objek; Mampu mendeklarasikan konsep pemrograman berorientasi objek (class, constructor, scope of variables); Mampu menjabarkan objek-objek dasar (array, array list, koleksi objek, iterator); mampu menjabarkan konsep perancangan class (coupling, kohesi, refactroing, inheritance, polymorph, substitusi); mampu menerapkan

pemrograman berbasis GUI, exception handling dan multithreading.

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

Prasyarat: Pemrograman Lanjut

Buku Ajar:

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

ENCE606029

TEKNOLOGI NIRKABEL

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini, mahasiswa belajar dasar-dasar teknologi nirkabel termasuk cara kerja, teknik-teknik, dan standarisasi pada jaringan nirkabel dan mobile. Setelah mengikuti mata kuliah ini, peserta mampu menjelaskan dasar-dasar teknologi nirkabel, teknik-teknik pada jaringan nirkabel, standar teknologi IEEE 802.11, 802.15 serta mampu menganalisis proyeksi teknologi nirkabel masa depan.

Topik: Teknologi 802.11 (Wireless LAN); Teknologi 802.15 (Bluetooth, Zigbee, WPAN)

Prasyarat: Jaringan Komputer + P

Buku Ajar:

1. Eldad Perahia, "Next Generation Wireless LANs: 802.11n and 802.11ac," 2nd Edition, Cambridge University Press; 2 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 SKS

Capaian Pembelajaran: Pada kuliah ini mahasiswa belajar membuat proposal skripsi berupa rancangan sistem, komponen, dan proses dalam bidang sistem embedded atau jaringan komputer dalam sebuah kerangka penelitian

Topik: Pendahuluan dan latar belakang penelitian; studi literatur; perancangan penelitian

Prasyarat: sudah memperoleh 120 SKS

Buku Ajar:

-

ENEE606023

KERJA PRAKTIK

2 SKS

Capaian Pembelajaran: Kuliah ini merupakan kuliah kerja pada perusahaan. Setelah mengikuti kuliah ini mahasiswa akan mampu ikut serta secara nyata dalam tim untuk menyelesaikan pekerjaan yang berkaitan dengan bidang TIK.

Pada kuliah ini mahasiswa akan diminta untuk dapat berperan secara aktif dalam bekerja secara nyata di perusahaan dalam menyelesaikan pekerjaan bersama tim. Mahasiswa juga akan mampu menyampaikan hasil pekerjaannya dalam Sidang Kerja Praktik.

Topik: Kerja Praktik di perusahaan

Prasyarat: telah memperoleh 90 SKS

Buku Ajar:

-

ENCE607032

KEWIRUSAHAAN DALAM TEKNOLOGI INFORMASI

2 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa mempelajari konsep dasar manajemen proyek dan pemasaran yang dikhususkan pada bidang Teknologi Informasi. Setelah mengikuti mata kuliah ini mahasiswa mampu mengimplementasikan konsep dan keterampilan kewirausahaan dalam inovasi teknologi informasi dalam bentuk rencana bisnis dalam inovasi expertise/product yang sesuai dengan perkembangan teknologi informasi.

Topik: Charging for Expertise, Think, Plan, Act Like Entrepreneur, Making a Business Successful, Taking the Initiative, Enabling an E-Business, Providing Outsource Services & Building a Contracting Business, kuliah tamu

Prasyarat: Sistem Berbasis Komputer

Buku Ajar:

1. Bill Aulet, *Disciplined Entrepreneurship: 24 Steps to a Successful Startup*, Wiley, Aug 12, 2013

ENCE607033**KAPITA SELEKTA TEKNIK KOMPUTER**

2 SKS

Capaian Pembelajaran: Pada kuliah ini mahasiswa akan mempelajari topik-topik terkini pada industri bidang teknik komputer. Setelah mengikuti kuliah ini mahasiswa mampu menganalisis perkembangan industri pada bidang teknik komputer dan permasalahan yang dihadapinya secara umum.

Topik: Konsep teknologi komputer terbaru; Aplikasi teknologi komputer terbaru; *Tradeoff* pada teknologi baru bidang teknik komputer; Masalah terbaru dalam Teknik Komputer

Prasyarat: Tidak ada.

Buku Ajar: Tidak ada. (akan ditentukan kemudian)

ENCE607034**PRAKTIKUM JARINGAN TELEKOMUNIKASI**

1 SKS

Capaian Pembelajaran: Kuliah ini bertujuan untuk memberikan pengalaman kepada mahasiswa dalam melakukan eksperimen-eksperimen yang menganalisa dan mendemonstrasikan konsep-konsep teknik telekomunikasi. Setelah menyelesaikan kuliah ini, mahasiswa mampu menjelaskan teknik-teknik modulasi dan multiplexing; mampu menjabarkan cara kerja semua komponen perangkat telekomunikasi dalam sistem jaringan

Topik: Pengantar Teknik Telekomunikasi, Modulasi Amplitudo, Modulasi Frekuensi, Sistem Teleponi, PCM dan TDM, Modulasi Digital, Digital Line Coding, Filter FIR

Prasyarat: Jaringan Telekomunikasi

Buku Ajar:

1. Modul Praktikum Teknik Telekomunikasi - Laboratorium Telekomunikasi.
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**INTERAKSI MANUSIA DAN KOMPUTER**

2 SKS

Capaian Pembelajaran: Pada mata kuliah ini, mahasiswa mempelajari dan menerapkan pendekatan analitis dan teori HCI dalam memproduksi sebuah prototipe interaksi manusia dan komputer yang berkualitas tinggi, efektif, dan efisien. Setelah mengikuti mata kuliah ini, mahasiswa akan mampu Mampu membuat rancangan dan menganalisis antarmuka sebuah sistem berbasis komputer manusia.

Topik: faktor dalam HCI; alat input output; interaksi; rancangan interaksi; HCI dalam software process; design rules; implementation support; evaluation techniques; universal design

Prasyarat: Tidak ada

Buku Ajar:

1. A.J. Dix, J.E. Finlay, G.D. Abowd and R. Beale, "Human-Computer Interaction", Third Edition, Prentice Hall, USA, 2003.
2. B. Shneiderman and C. Plaisant, "Designing The User Interface: Strategies for Effective Human Interaction", Fifth Edition, Pearson-Addison Wesley, 2010.

ENCE608036**SKRIPSI**

3 SKS

Capaian Pembelajaran: Pada mata kuliah spesial ini, mahasiswa akan belajar meneliti dan terlibat dalam sebuah tim peneliti. Setelah mengikuti mata kuliah ini, mahasiswa akan mampu membuat rancangan sistem, komponen, dan proses dalam bidang sistem embedded atau jaringan komputer dalam kerangka penelitian. Mahasiswa akan mampu melaksanakan penelitian yang direncanakan, mampu menganalisis hasil penelitian, mampu menyampaikan hasil penelitian dalam sidang skripsi.

Topik: Implementasi rancangan dan eksperimen penelitian; Analisis data; Kesimpulan

Prasyarat: Seminar

Buku Ajar:

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ENCE608037

MANAJEMEN PROYEK TEKNOLOGI INFORMASI

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai prinsip manajerial pada proyek IT. Setelah mengikuti kuliah ini diharapkan mahasiswa mampu menerapkan manajemen proyek, termasuk manajemen tim, penjadwalan, konfigurasi proyek, manajemen informasi, dan desain rencana proyek

Topik: Project management principles; Risk, dependability, safety and fault tolerance; IT Project Collaboration strategies; Relevant tools, standards and/or engineering constraints

Prasyarat: Rekayasa Perangkat Lunak

Buku Ajar:

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**PEMROSESAN SINYAL MULTIMEDIA**

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai teknologi dalam pemrosesan sinyal multimedia untuk mendukung penyampaian informasi multimedia. Setelah mengikuti mata kuliah ini diharapkan mahasiswa akan mampu melakukan analisis sinyal multimedia dalam jaringan menggunakan teknik-teknik yang sesuai. Mahasiswa akan mampu menjabarkan komponen-komponen dalam file multimedia, teknik kompresi multimedia, mampu melakukan pengolahan dan analisis data multimedia seperti gambar, suara dan video. Mahasiswa juga akan mampu menerapkan algoritma pengolahan citra digital untuk menganalisis informasi di dalamnya.

Topik: Pengantar Jaringan Multimedia, Pengkodean dan Kompresi Sinyal Multimedia (gambar, suara, video), Perbaikan Kualitas Citra, Pengolahan citra berwarna, Segmentasi citra, Representasi dan deskripsi, Pengenalan obyek.

Prasyarat: Pemrograman Lanjut

Buku Ajar:

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.

MATA KULIAH PILIHAN YANG DITAWARKAN OLEH TEKNIK KOMPUTER:**ENCE607101****PERANCANGAN VLSI**

2 SKS

Capaian Pembelajaran: Mahasiswa mampu menjelaskan tahapan proses pada perancangan CMOS, mengimplementasikan perancangan *Scale of Lambda*, mengevaluasi karakteristik dan kinerja rangkaian transistor *power* dan CMOS digital, serta menjelaskan teknik optimisasi desain level tinggi.

Topik: Mixed-signal circuits; Design parameters issues; Circuit modelling & Simulation methods

Prasyarat: Dasar Sistem Digital + P

Buku Ajar:

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 Publisher, 2006.

ENCE607102**REKAYASA DAN ANALISIS DATA**

3 SKS

Capaian Pembelajaran: Pada mata kuliah ini mahasiswa diarahkan agar mampu mengimplementasikan algoritma analisis data ke dalam program. Setelah mengikuti kuliah ini mahasiswa akan mampu menggunakan teknik matematika dan statistik dasar yang biasa digunakan dalam pengenalan pola. Mahasiswa akan mampu menggunakan beberapa teknik umum baik algoritma pembelajaran tersupervisi maupun tanpa supervisi dalam melakukan pengenalan pola, klasifikasi dan clustering.

Topik: Pengenalan *pattern recognition*, *artificial neural networks*, algoritma back-propagation, unsupervised learning, Principal Component Analysis

Prasyarat: Analisis Vektor dan Peubah Kompleks, Probabilitas & Proses Stokastik, Pemrograman Lanjut

Buku Ajar:

1. Christopher M. Bishop, "Pattern Recognition and Machine Learning

ENCE608103**TEKNOLOGI BIG DATA****3 SKS**

Capaian Pembelajaran: Pada kuliah ini akan dibahas mengenai teknologi yang dapat digunakan untuk menyelesaikan permasalahan big data di berbagai bidang (misalnya: internet, telekomunikasi, retail). Mahasiswa mampu mengelola (collection, preparation, processing, validation, interpretation) dan menganalisa data dalam jumlah besar dan berstruktur acak.

Topik: Into to Data Engineering, Hadoop Architecture, The Hadoop Distributed Filesystem, Setting Up Hadoop Cluster, Administering Hadoop, MapReduce Framework, Developing a MapReduce Application, Hive Database, Spark Processing, Big Data Analytic Project

Prasyarat: Sistem Basis Data

Buku Ajar:

1. Jure Leskovec, Anand Rajaraman, Jeff Ullman, Mining of Massive Datasets, Cambridge University Press, 2014
2. Tom White, "Hadoop: The Definition Guide", Third Edition, O'Reilly, 2012

ENCE608104**DASAR REGULASI DAN KEBIJAKAN PUBLIK TIK****3 SKS**

Capaian Pembelajaran: Pada mata kuliah ini akan dibahas mengenai dasar-dasar penyusunan dan pengembangan regulasi dan kebijakan publik, khususnya di era perkembangan teknologi informasi dan komunikasi (TIK) yang sangat cepat. Setelah mengikuti kuliah ini, mahasiswa akan mampu menjelaskan dasar-dasar kebijakan publik, hukum dan regulasi Telekomunikasi, dan tata kelola Internet. Pada kuliah ini juga akan dibahas contoh-contoh aplikatif regulasi dan kebijakan di bidang Telekomunikasi dan Internet, sekaligus mengantisipasi kecepatan perubahan dan dinamika yang terjadi di tengah masyarakat sebagai implikasi perkembangan TIK.

Topik: Administrasi Publik, Arti Penting Kebijakan Publik, Ragam Penelitian dan Metode Penelitian Kebijakan, Studi Perbandingan Kebijakan, Pengantar Hukum dan Regulasi Telekomunikasi, Tinjauan Ekonomi atas Regulasi Telekomunikasi, Isu-isu Kunci Regulasi Telekomunikasi, Memahami Tata Kelola Internet, Pemangku Kepentingan Tata Kelola Internet, Proses Tata Kelola Internet

Prasyarat: -

Buku Ajar:

1. Ian Walden, "Telecommunications Law and Regulation", Oxford University Press, 2012
2. Jovan Kurbalija, "Tentang Tata Kelola Internet: Sebuah Pengantar", APJII, 2011
3. Riant Nugroho, "Public Policy: Dinamika Kebijakan, Analisis Kebijakan, Manajemen Kebijakan", Elex Media Komputindo, 2012

Syllabus

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, transistors, 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 organiza-

tion 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 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 20 12.

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 interfacing 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 - Sub-routines, 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

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 telecommunication 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 stakeholder, 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