SILABUS RINGKAS
PROGRAM STUDI JARINGAN TELEKOMUNIKASI DIGITAL
JURUSAN TEKNIK ELEKTRO
POLITEKNIK NEGERI MALANG
TAHUN AKADEMIK 2021/2022

SHORT SYLLABUS
DIGITAL TELECOMMUNICATION NETWORK STUDY PROGRAM
ELECTRICAL ENGINEERING DEPARTMENT
STATE POLYTECHNIC OF MALANG
ACADEMIC YEAR 2021/2022

Mata Kuliah ***Course Name***	:	**Bahasa Inggris I** ***English I***
Kode Mata Kuliah ***Course Code***	:	**RTD211001** ***RTD211001***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	:	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menjelaskan unsur-unsur kalimat dan membuat kalimat yang baik dan benar sesuai dengan tata bahasa baku bahasa Inggris.
Be able to explain sentence elements and make good and correct sentences according to standard English grammar.

b. Mahasiswa memahami cara berbicara dalam bahasa Inggris dengan benar dan hal-hal yang menyangkut proses dalam matematika serta bidang elektronika sederhana.
Students understand how to speak English correctly and things related to processes in mathematics and simple electronics.

Pokok Bahasan
Main Subjects

1. Pengenalan diri
   Self introducing
2. Tata bahasa
   Grammar
3. Bentuk kata kerja
   Tenses
4. Ekspresi Numerik dalam proses aritmatika
   Numerical Expressions in Arithmetic Process
5. Ekspresi geometris
   Geometrical expressions
6. Diagram dalam elektronika
   Diagrams in electronics

7. Sudut dan bentuk
   Angle and shape
8. Objek dan lokasi/posisi
   Object and location/position
9. Sifat bahan
   Properties of materials
10. Simbol dan rumus elektronik
    Electronics symbols and formulas
11. Telekomunikasi: tinjauan sejarah singkat
    Telecommunications: a brief historical review

Referensi
Reference(s)

English in Electrical and Electronics Engineering
English in Focus
Oxford English for Electronics

Mata Kuliah ***Course Name***	:	**Pendidikan Kewarganegaraan** ***Citizenship Education***
Kode Mata Kuliah ***Course Code***	:	**RTD211002** ***RTD211002***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	:	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu memahami dan menerapkan nilai-nilai kewarganegaraan dalam kehidupan sehari-hari.
   Capable to understand and apply civic values in daily life.
b. Mahasiswa mampu memahami, menjelaskan, menerapkan materi terkait identitas nasional, negara dan konstitusi.
   Students are able to understand, explain, apply materials related to national identity, state and constitution.
c. Mahasiswa mampu memahami, menjelaskan, menerapkan materi terkait hubungan warga negara dengan negara, Demokrasi, Hak Asasi manusia, Wawasan Nusantara, Ketahanan Nasional dan Pendidikan Anti Korupsi.
   Students are able to understand, explain, apply materials related to the relationship between citizens and the state, Democracy, Human Rights, Archipelago Insights, National Resilience and Anti-Corruption Education.
d. Mahasiswa mampu menganalisis berbagai permasalahan berbangsa dan bernegara.
   Students are able to analyze various national and state problems.

Pokok Bahasan
Main Subjects

1. Pancasila sebagai Dasar Negara dan Ideologi Nasional
   Pancasila as the Basic State and National Ideology
2. Identitas Nasional
   National Identity
3. Hak dan Kewajiban Warga negara
   Rights and Duties of Citizens
4. Negara dan Konstitusi
   The State and the Constitution
5. Demokrasi dan Pendidikan Demokrasi
   Democracy and Democracy Education
6. Negara Hukum dan Hak Asasi Manusia
   The Rule of Law and Human Rights
7. Wawasan Nusantara sebagai Geopolitik Indonesia
   Archipelago Insights as Indonesian Geopolitics
8. Ketahanan Nasional sebagai Geostrategi Indonesia
   National Resilience as Indonesia's Geostrategy
9. Pendidikan Anti Korupsi
   Anti-Corruption Education

Referensi
Reference(s)

Ridwantono, Totok. 2007, Pendidikan Kewarganegaraan Republik Indonesia, Bayu Media Publishing, Malang.
Santoso, Kholido. 2004, Paradigma Baru Memahami Pancasila dan UUD 1945, AK Grup, Yogyakarta.
Undang-Undang Dasar 1945
Undang-Undang Nomor 12 tahun 2006 tentang Kewarganegaraan
Undang-Undang Nomor 39 tahun 1999 tentang Hak Asasi Manusia
Winarno. 2011, Pendidikan Kewarganegaraan, PT Bumi Aksara, Jakarta.

Mata Kuliah ***Course Name***	:	**QMS** ***(Quality Management System)***
Kode Mata Kuliah ***Course Code***	:	**RTD211003** ***RTD211003***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	:	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu mengembangkan kualifikasi diri yang meliputi perilaku yang efektif; melakukan inisiatif, kreatif, dan inovasi, cara komunikasi yang efektif, cara membangun hubungan antarpersonal, membangun tim kerja yang efektif, kecakapan dalam pemecahan masalah.
   Students are able to develop self-qualifications (effective behavior; take initiative, be creative, and innovate, how to communicate effectively, how to build interpersonal relationships, build effective work teams, problem solving skills).
b. Mampu memahami dan menerapkan prinsip Sistem Manajemen Mutu (SMM) pada organisasi/

perusahaan untuk mencapai mutu yang bersatndar internasioanl (ISO 9001)
Students are able to understand and apply the principles of Quality Management System (QMS) in the organization/company to achieve international standard quality (ISO 9001)

Pokok Bahasan
Main Subjects

1. Kebiasaan berperilaku mutu yang efektif pada level individu, masyarakat, maupun institusi
   The effective quality behavior habits at the individual, community, and institutional levels
2. Inisiatif, kreatif, dan berinovatif
   Initiative, creative, and innovate
3. Komunikasi yang efektif
   Effective communication
4. Kerja kelompok yang efektif
   The effective group works
5. Mengenali cara membangun hubungan antar personal
   Recognize how to build interpersonal relationships
6. Mengidentifikasi masalah dan mencari solusi masalah secara ilmiah
   Identify problems and find solutions to problems scientifically
7. Mengidentifikasi strategi pelayanan pelanggan
   Identify customer service strategy
8. Mengidentifikasi organisasi/perusahaan yang modern, karyawan yang ideal (top performer), dan kepemimpinan
   Identify modern organizations/companies, ideal employees (top performers), and leadership
9. Penerapan QMS untuk memperoleh sertifikat IS0 9001/2000
   QMS implementation to obtain IS0 9001/2000 certificate
10. Mengenali perangkat kendali mutu
    Recognize quality control devices
11. Program manajemen sumber daya (SDM, Infrastruktur, dan Lingkungan)
    Resource management programs (HR, Infrastructure, and Environment)

Referensi
Reference(s)

Entreupreneurship & Quality Management System Skill Development Program, Bandung, 2007.
Foster. 2001. Managing Quality, an Interactive Approach. Prentice Hall
Gitlow, Howard S.2001. Quality Management System: A Practical Guide. Florida USA: CRC Presss LLC.
awase, T. 2001. Human Centred Problem Solving: The Management of Improvement. Tokyo: Asian Productivity Organization

Mata Kuliah ***Course Name***	:	**Matematika Teknik I** ***Engineering Mathematics I***
Kode Mata Kuliah ***Course Code***	:	**RTD211104** ***RTD211104***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**1 (Satu)** **1 (*One*)**
Capaian Pembelajaran yang Dibebankan pada Mata Kuliah		

Learning Outcomes Imposed on Course

Mahasiswa terampil dan mampu dalam menyelesaikan soal-soal fungsi, limit, kontinuitas, diferensial, integral, bilangan kompleks, penyelesaian sistem persamaan linier menggunakan matriks, nilai dan vektor eigen.
Students are skilled and able to solve problems of functions, limits, continuity, differentials, integrals, complex numbers, solving systems of linear equations using matrices, values and eigenvectors.

Pokok Bahasan
Main Subjects

1. Sistem bilangan real, himpunan penyelesaian dari persamaan dan pertidaksamaan.
   The real number system, the set of solutions to equations and inequalities.
2. Konsep fungsi, limit dan kontinuitas.
   Concept of function, limit and continuity.
3. Rumus dasar turunan, teorema dasar turunan, turunan fungsi trigonometri, turunan fungsi transenden, aturan rantai turunan.
   Basic derivative formulas, basic theorems of derivatives, derivatives of trigonometric functions, derivatives of transcendent functions, derivative chain rules.
4. Tangen, nilai maksismum dan minimum fungsi, menentukan kecepatan dan percepatan menggunakan turunan.
   The tangent, the maximum and minimum values of the function, determines the velocity and acceleration using the derivative.
5. Rumus dasar integral dan teknik integrasi (Penggunaan integral lipat dua dan lipat tiga).
   Basic integral formulas and integration techniques (Use of double and triple integrals).
6. Integral lipat dua dan lipat tiga.
   Double and triple integrals.
7. Harga rata-rata fungsi periodik dan harga efektif fungsi periodic.
   The average value of the periodic function and the effective value of the periodic function.
8. Bilangan kompleks dan bentuk polarnya.
   Complex numbers and it's polar forms.
9. Jenis-jenis matriks, pengertian dari invers matriks, dan detrminan matriks.
   Types of matrices, understanding of inverse matrix, and determinants of matrices.
10. Rumus dari sistem persamaan linier.
    Formulas of a system of linear equations.
11. Nilai eigen dan vektor eigen.
    Eigenvalues and eigenvectors.

Referensi
Reference(s)

Ayres, Frank. 2009. Calculus. McGraw Hill Professional.
Anton, Howard. 2010. Elementary Linear Algebra. Canada: Anton Textbook, Inc.
Dewi, Ratna dkk. 2013. Matematika Teknik. Bandung: Rekayasa Sains.
Mursita, Danang. 2011. Matematika untuk Perguruan Tinggi. Bandung: Rekayasa Sains.
Purcel, Edwin J. 2004. Kalkulus Jilid 1 Edisi 8 (Terj.). Jakarta: Penerbit Erlangga.
Spiegel, Murray. 2013. Probability and Statistics. McGraw Hill Companies.
Stroud, KA. 2003. Matematika Teknik Jilid 1 Edisi 5 (Terj.). Jakarta: Penerbit Erlangga.

Mata Kuliah : Workshop Alat Ukur dan Pengukuran

Course Name		***Workshop of Instrumentation & Measurement***
Kode Mata Kuliah ***Course Code***	**:**	**RTD211105** ***RTD211105***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 5 jam per minggu** ***2 credits / 5 hours per week***
Semester ***Semester***	**:**	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menjelaskan hukum Ohm dan mampu melakukan pengukuran besaran listrik dasar menggunakan AVO meter.
Students will be able to define Ohm's law and able to measure basic electric quantities using multimeter.
b. Mahasiswa mampu mendesain alat ukur sederhana dan merealisasikan desainnya.
Students will be able to design simple measurement instrument and build the design
c. Mahasiswa mampu menjelaskan tentang akurasi dan presisi alat ukur serta penyebab kesalahan pada alat ukur.
Students will be able to explain about acuracy, precission of measurement instrument and know the source of error in instrument reading.
d. Mahasiswa mampu menjelaskan rangkaian jembatan AC DC.
Students will be able to explain AC DC bridge circuit
e. Mahasiswa mampu menjelaskan cara kerja osciloscope dan mampu mengoperasikannya.
Students will be able to explain how oscilloscope works and able to operate it.
f. Mahasiswa mampu mengoperasikan alat ukur dan pendukung alat ukur lainnya.
Students will be able to operate some measurement tools and its supporting tools.
g. Mahasiswa mampu menjelaskan cara kerja spectrum analyzer dan Q meter serta mampu mengoperasikannya.
Students will be able to explain how spectrum analyzer and Q meter work and also able to operate them.
h. Mahasiswa mampu menjelaskan cara kerja vector network analyzer serta mampu mengoperasikannya.
Students will be able to explain how vector network analyzer works and able to operate it.

Pokok Bahasan
Main Subjects

1. Hukum Ohm dan Pengoperasian Multimeter
Ohm's lay and Multimeter
2. Pengukuran tegangan, arus dan resitansi
Voltage, current and resistance measurements
3. Instrumen Permanent Magnet Moving Coil (PMMC) dan teknik membaca alat akur analog, *interface*, susunan dan perancangan alat dasar.
Instrumen Permanent Magnet Moving Coil and Analog Measurement reading, and also designing of basic analog measurement instrument.
4. Statistik dan penyimpangan alat ukur, ketelitian, cara pemasangan.
Statistic, measurement result deviation, precission and how to install measurement instrument
5. Rangkaian jembatan DC, AC dan fungsinya.
Bridge circuit and its functions
6. Blok sistem Osiloskop dan fungsi panel alat ukur.
Oscloscope circuit and how to measure using osciloscope

7. Pengukuran dengan osilokop, ujung ukur, ujung sumber, karakteristik, dan sumber bantu pengukuran, generator fungsi.
   Thorough measurement using osciloscope and function generator
8. Alat ukur besaran listrik lain dan keutamaan penggunaannya
   Miscellaneous measurement instruments and their advantages
9. Alat ukur analisa gelombang (spektrum, distorsi, Q meter) dan teknik pengukurannya.
   The use of Spectrum analyzer and Q meter and how to measure using them.
10. Vector network analyzer
    Vector network analyzer

Referensi
Reference(s)

Main:

1. William D.Cooper, Instrumentasi Elektronika dan Teknik Pengukuran, , Penerbit Erlangga, 1985.

Supplementary:

1. Sapiie, Nishino, *Pengukuran dan Alat-alat Ukur Listrik*, Pradnya Paramita, 1994
2. Ranggan,D S, Sarma, G R, Mani, Y S V, *Instrumentation Device and Systems*, McGraw- Hill Publishing Company limited,
3. Doublin, W E, Measurement and Instrumentation,
4. Clyde F Coombs Jr., Electronics Instrument Handbook, Mc Graw Hill, 2004.
5. User Manual

Mata Kuliah ***Course Name***	**:**	**Bengkel Elektromekanik** ***Electromechanics Workshop***
Kode Mata Kuliah ***Course Code***	**:**	**RTD211106** ***RTD211106***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**3 sks / 6 jam per minggu** ***3 credits / 6 hours per week***
Semester ***Semester***	**:**	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu membuat gambar teknik, mendesain rangkaian elektronika dan Layout PCB.
   Students will be able to make engineering drawings, electronic circuits designs and PCB layouts.
b. Mahasiswa mampu memahami fungsi penggunaan dan menggunakan peralatan atau perkakas bengkel mekanik (mesin bor, kikir, mesin potong manual, mesin bending manual, dan lain-lain).
   Students will be able to understand the functions and able to use mechanical workshop tools or equipment (drilling machines, files, manual cutting machines, manual bending machines, etc.).
c. Mahasiswa mampu memahami fungsi penggunaan dan menggunakan peralatan atau perkakas peralatan elektronik (Latihan menyolder).
   Students will be able to understand the function and able to use electronic equipment (soldering training).
d. Mahasiswa mampu menggunakan alat-alat elektronik untuk desain dan pembuatan papan rangkaian tercetak (printed circuit board – PCB) baik secara software (simulator) maupun hardware.
   Students will be able to utilize electronic device to design and produce printed circuit board, both by software

and hardware.

e. Mahasiswa mampu menggunakan software aplikasi desain gambar 3D untuk Pembuatan Box.
Students will be able to utilize 3D design software to make 3D Printing.

f. Mahasiswa mampu mendesain dan merealisasikan suatu proyek.
Students will be able to make laboratory module as final project of this course

Pokok Bahasan
Main Subjects

1. Dasar Gambar Teknik
   Basic of engineering drawings
2. Desain Rangkaian Elektronika dan Layout PCB
   Electronics circuit and PCB's layout design
3. Utilitas Gedung (Instalasi Listrik, PABX, Tata Suara dan TV, Alarm)
   Building Utility
4. Pengenalan dan Penggunaan Peralatan Mekanik (mesin bor, kikir, mesin potong manual, mesin bending manual, dan lain-lain) dalam pembuatan Box.
   Introduction to usage of power tools
5. Pengenalan dan Penggunaan Peralatan Elektronik (Latihan menyolder)
   Introduction to soldering technique
6. Pembuatan Box menggunakan software aplikasi desain gambar 3D
   3D design for 3D printing
7. Penyablonan
   Screen printing

Referensi
Reference(s)

Main:

1. Aad hariyadi, "Modul ajar bengkel elektromekanik 1T Polinema 2017
2. Koesmarijanto, "bengkel elektromekanik, "polinema 2014

Supplementary:

1. Tim Fakultas Teknik Univ Negeri Yogyakarta 2001. "Dasar-Dasar Menggambar Teknik".
2. Dwi Tanggoro 2000. "Utilitas Bangunan", Universitas Indonesia (UI-Press)
3. Yayasan PUIL (2000). Persyaratan umum Instalasi Listrik 2000.
4. Malvino, Albert Paul. Electronic Principles, McGraw-Hill, Inc.
5. Robert S. Villanucci, Alexander W. Avgis, William F. Megow, Electronic Techniques: Shop Practices and Construction, Prentice Hall.
6. 3D Printing Software

Mata Kuliah ***Course Name***	**:**	**Dasar Teknik Elektronika** ***Electronic Devices and Engineering***

Kode Mata Kuliah ***Course Code***	**:**	**RTD211107** ***RTD211107***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	**:**	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menyebutkan dan menjelaskan jenis serta karakter komponen elektronika aktif dan pasif
Students will be able to name and describe the types and characteristics of active and passive electronic devices
b. Mahasiswa mampu menjelaskan cara kerja semikonduktor diode, transistor dan prinsip kerja penguat transistor.
Students will be able to explain how diode and transistor works and how transistor can amplify signals.
c. Mahasiswa mampu menjelaskan tentang penguat cascade
Students will be able to explain cascade amplifiers
d. Mahasiswa mampu mendesain penguat kelas A, B, AB dan C
Students will be able to design class A, B, AB and C amplifiers
e. Mahasiswa mampu menjelaskan tentang umpan balik dan stabilitas
Students will be able to explain about feedback and stability.
f. Mahasiswa mampu menjelaskan op-amp dan aplikasinya
Students will be able to explain how op-amp works and how to use it.
g. Mahasiswa mampu menyebutkan jenis dan prinsip kerja catu daya (baterai dan power supply lainnya)
Students will be able to explain about various kind of power supply
h. Mahasiswa mampu menjelaskan prinsip kerja rangkain mixer, modulator dan demodulator
Students will be able to explain how mixer, modulator and demodulator circuit work.
i. Mahasiswa mampu mendesain rangkaian filter pasif dan aktif
Student will be able to design active and passive filter circuit

Pokok Bahasan
Main Subjects

1. Jenis dan karakteristik komponen aktif dan pasif
The types and characteristics of active and passive electronic devices
2. Diode, transistor dan rangkaian penguat
Diode, transistor and amplifier
3. Penguat cascade
Cascade amplifer
4. Penguat kelas A, B, AB dan C
Class A, B, AB and C amplifiers
5. Umpan balik dan stabilitas
Feedback and stability
6. Op-Amp dan aplikasinya
Op-Amp and its application
7. Catu daya (baterai dan power supply)
Power supply
8. Mixer, modulator dan demodulator

Mixer, modulator and demodulator

9. Filter aktif dan pasif

Referensi
Reference(s)

Main:

1. Neamen, 2007, *Microelectronics*, Mc. Graw Hill, 2007

Supplementary:

2. Sapiie Poynter, *Introducing Electronic Device and Circuit*, Prentice Hall, 2003
3. Foire, *Opamp and Linear Integrated Circuits*, Delmar, 2001

Mata Kuliah ***Course Name***	**:**	**Rangkaian Listrik** ***Electrical Circuit***
Kode Mata Kuliah ***Course Code***	**:**	**RTD211108** ***RTD211108***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**3 sks / 4 jam per minggu** ***3 credits / 4 hours per week***
Semester ***Semester***	**:**	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa diharapkan dapat memahami konsep dasar teknik elektro meliputi: konsep arus, tegangan dan daya, hukum Kirchoff, karakteristik komponen, teori rangkaian, analisa rangkaian, dan konsep fasor.
Students are expected to understand the basic concepts of electrical engineering including: current, voltage and power concepts, Kirchhoff's laws, component characteristics, circuit theory, circuit analysis, and phasor concepts.

b. Mahasiswa diharapkan dapat melakukan analisis pada rangkaian AC dan DC
Students are expected to be able to perform analysis on AC and DC circuits.

Pokok Bahasan
Main Subjects

1. Konsep Dasar Rangkaian Listrik: konsep arus, tegangan, daya
Basic Concepts of Electric Circuits: concepts of current, voltage, power
2. Analisis Rangkaian, Hukum Kirchoff, Hukum Ohm
Circuit Analysis, Kirchoff's Law, Ohm's Law
3. Teorema Rangkaian dan Respon Alami
The Circuit Theorem and Natural Response
4. Konsep Phasor dan Jembatan Wheatstone

Phasor Concept and Wheatstone Bridge

5. Hukum Kirchoff & Superposisi
   Kirchhoff's Laws & Superposition
6. Teori Rangkaian Thevenin dan Norton
   Thevenin and Norton circuit theory
7. Konsep fasor dan aplikasinya
   The concept of the phasor and its application
8. Rangkaian R, L, C (analisis DC dan AC)
   R, L, C circuit (DC and AC analysis)
9. Resonansi seri dan paralel
   Series and parallel resonance

Referensi
Reference(s)

Mismail, Budiono, 2000. Rangkaian Listrik 1, Bandung: ITB Press.
Mismail, Budiono, 2000. Rangkaian Listrik 2, Bandung: ITB Press.
Ramdhani, Muhamad, 2008: Rangkaian Listrik, Erlangga
Sadiku, Matthew & Alexander, Charles. Fundamental of Electric Circuits, 4th Edition. 2000. Mc. Graw Hill Higher Education
Hayt, William H., Jr., dan Jack E. E Kemmerly, 2005: Rangkaian Listrik 1, 6th edition.
Sudirham, Sudaryanto, 2002: Analisis Rangkaian Listrik, Bandung: ITB Press.

Mata Kuliah ***Course Name***	**:**	**Teknik Digital** ***Digital Technique***
Kode Mata Kuliah ***Course Code***	**:**	**RTD211109** ***RTD211109***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**3 sks / 4 jam per minggu** ***3 credits / 4 hours per week***
Semester ***Semester***	**:**	**1 (Satu)** **1 (*One*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu mengerti dan memahami prinsip-prinsip teori rangkaian digital
   Able to know and understand the principles of digital circuit theory
b. Mampu mengerti dan memahami aplikasi teori rangkaian digital pada sistem.
   Able to know and understand the application of digital circuit theory to the system.

Pokok Bahasan
Main Subjects

1. Konsep Digital (Sistem analog, digital dan hybrid)
   Digital Concepts (Analog, digital and hybrid systems)
2. Sistem Bilangan dan Sandi
   Number and Coding System
3. Rangkaian terintegrasi (Integrated Circuit/IC) Digital
   Digital Integrated Circuit (IC)
4. Gerbang Logika Dasar (OR, AND, NOT, NOR, NAND, XOR, XNOR)
   Basic Logic Gates (OR, AND, NOT, NOR, NAND, XOR, XNOR)
5. Aljabar Boolean dan Teori De Morgan
   Boolean Algebra and De Morgan's Theory
6. Rangkaian Logika Pengolah Data (Encoder, Decoder, Multiplexer dan Demultiplexer)
   Data Processing Logical Circuits (Encoder, Decoder, Multiplexer and Demultiplexer)
7. Rangkaian Aritmatika (Adder, Comparator, ALU)
   Arithmetic Circuits (Adder, Comparator, ALU)
8. Flip – Flop (Set-Reset, JK, Data dan Toggle)
   Flip – Flop (Set-Reset, JK, Data and Toggle)
9. Pencacah (Counter) Serial dan parallel
   Serial and parallel counter
10. Register (PIPO, SIPO, PISO, SISO)
    Register (PIPO, SIPO, PISO, SISO)
11. Rangkaian Adder dan Subtractor
    Adder and Subtractor Circuit
12. Rangkaian Decoder dan Encoder
    Decoder and Encoder Circuit
13. Konverter Sinyal (ADC & DAC).
    Signal Converter (ADC & DAC).

Referensi
Reference(s)

Chirlian PM., Analysis and Design of Integrated Circuit, Prentice Hall, 2008 Hall, Douglas V. Microprocessor and Digital System, Singapore, 1993

Hill, F. J. and Peterson, G. R. Switching Theory and Logical Design. New York: John Wiley & Sons, Inc. 1993

Malvino, A. P. and Brown J. A. Digital Computer Electronics. Lake Forest. Glencoe Division of Macmillan / McGraw-Hill School Publishing Company. 1999.

Mano, M. M. Computer System Architecture (3rd Edition). Englewood Cliff. Prentice Hall, Inc. 1992 Mismail, B. Dasar – Dasar Rangkaian Logika Digital. Bandung: Penerbit ITB. 1998

Murdocca, M. and Heuring, V.P. Principles of Computer Architecture. Englewood Cliff: Prentice Hall. 1999 National Semiconductor, Logic Data Book, ----

Samuel C. Lee, Digital Circuit and Logic Design, Prentice Hall, 2006

Sicard, E. and Xi, C. Dsch2 Commands. Http://intrage.insa-tise.fr/~etienne.2003

Smith, R. J. and Dorf, R. C. Circuits, Devices and Systems. New York. John Wiley & Sons. 1992 Texas Instrument, Designing with TTL IC, 2006

Tocci R. J. & Widmer, R.S. Digital Systems, Principle and Application, 8th Edition. Englewood Cliff. Prentice Hall, 2001

Widjanarka, Wijaya, Teknik Digital, Erlangga, Jakarta, 2006

William Stalling, Computer Organization and Architecture, Prentice Hall, 5Th ed, 2000.

Mata Kuliah	:	**Dasar Sistem Telekomunikasi**

Course Name		***Basic Telecommunications System***
Kode Mata Kuliah ***Course Code***	:	**RTD211110** ***RTD211110***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**3 sks / 4 jam per minggu** **3 *credits* / 4 *hours per week***
Semester ***Semester***	:	**1 (Satu)** ***1 (One)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa memahami ruang lingkup sistem Telekomunikasi
Students understand the scope of the Telecommunication system
b. Mahasiswa mampu menjelaskan konsep dasar, satuan lotgaritmis, dan macam-macam telekomunikasi
Students are able to explain basic concepts, lotgarithmic units, and various types of telecommunications
c. Mahasiswa mampu menjelaskan tentang alokasi frekuensi, sinyal informasi dan macam-macam terminal
Students are able to explain about frequency allocation, signal information and various terminals
d. Mahasiswa menjelaskan struktur Jaringan Telekomunikasi
Students explain the structure of the Telecommunication Network
e. Mahasiswa memahami modulasi dan multipleksing
Students understand modulation and multiplexing
f. Mahasiswa memahami tentang transduser, sistem pemancar dan penerima
Students understand about transducers, transmitter and receiver systems
g. Mahasiswa mampu menjelaskan *fixed, wireless*, dan *fixed wireless communication*
Students are able to explain fixed, wireless, and fixed wireless communication

Pokok Bahasan
Main Subjects

1. Teori Informasi
Information Theory
2. Pengertian, prinsip dasar, satuan logaritmis dan macam-macam telekomunikasi
Definition, basic principles, logarithmic units and types of telecommunications
3. Sejarah perkembangan telekomunikasi
The history of telecommunications development
4. Alokasi spektrum frekuensi dan hambatan gelombangnya
Allocation of the frequency spectrum and its wave resistance
5. Sinyal informasi dan noise
Information signal and noise
6. Terminal telekomunikasi, terminal suara (radio dan telepon), terminal video, dan terminal data
Telecommunications terminals, voice terminals (radio and telephone), video terminals, and data terminals
7. Struktur jaringan telekomunikasi
Telecommunication network structure
8. Pengenalan modulasi dan multipleksing
Introduction to modulation and multiplexing
9. Sistem pemancar dan penerima
Transmitter and receiver system
10. Pengenalan transducer

Introduction of transducer

11. Komunikasi Tetap
    Fixed Communication
12. Komunikasi Nirkabel
    Wireless Communication
13. Komunikasi Nirkabel Tetap
    Fixed Wireless Communication

Referensi

Reference(s)

Wayne Tomasi, Advanced Electronic Communication Systems, Prentice Hall, 2001

Haykin Simon, Communication System, John Wiley & Sons, Inc, 4th edition, 2001.

Hwei P Hsu, Schaum Outlines: Analog & Digital Communications, International edition. McGraw-Hill, 2002.

Xiaodong Wang, H.Vincent. Poor Wireless Communication Systems: Advanced Techniques for Signal Reception. Prentice Hall PTR 2003.

Santoso Gatot, Teknik Telekomunikasi, Graha Ilmu, Yogyakarta, 2004.

Sharma Sanjay, Communication System (analog & digital), S.K.Kataria & Sons, third edition, New Delhi, 2005.

Lillian Goleniewski, Telecommunication Essentials, Addison Wesley Professional, 2007.

Benhard Sklar, Fundamental and Application Digital Communication, 2008.

V.S.Bagad, I.A.Dhotre, Jr, Data Communication and Networking, Technical Publications, 2009.

K.Prabhakara Rao, Analog Communications, Hyderabad. 2010,

Michael P. Fitz, Analog Communications Theory, Ohio State University. 2010.

K Sambasiva Rao & Srinivasa Rao. Analog Communications Lab. Manual. Bapatla. 2010.

NED University of Engineering & Technology, Communications System Practical Work Book, Karachi. 2011.

Khosrow Rad, Laboratory Manual Communications, Lab-Volt Systems Inc, California State University, Los Angeles. 2011.

Leon W. Couch, Digital and Analog Communication Systems, Prentice Hall, 8th. 2012.

Annabel Z. Dood, The Essential Guide to Telecommunications, Prentice Hall, 2012.

Mata Kuliah ***Course Name***	:	**Matematika Teknik II** ***Engineering Mathemathics II***
Kode Mata Kuliah ***Course Code***	:	**RTD212101** ***RTD212101***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Memahami dan mampu menyelesaikan soal-soal diferensial parsial, persamaan diferensial biasa, transformasi laplace, probabilitas dan statistik, deret fourier, dan dasar-dasar fungsi gamma, fungsi beta, dan fungsi bessel.

Understand and be able to solve partial differential problems, ordinary differential equations, Laplace transforms, probability and statistics, Fourier series, and the basics of gamma functions, beta functions, and Bessel functions.

Pokok Bahasan
Main Subjects

1. Diferensial parsial
   Partial Differential
2. Persamaan diferensial biasa
   Ordinary differential equation
3. Transformasi laplace
   Laplace transform
4. Probabilitas dan statistik (distribusi normal, gausian, poisson, eksponensial)
   Probability and statistics (normal distribution, gausian, poisson, exponential)
5. Deret fourier
   Fourier series
6. Dasar-dasar fungsi gamma, fungsi beta, dan fungsi Bessel
   The basics of the gamma function, beta function, and Bessel function

Referensi
Reference(s)

Adkins, William A. 2012: Ordinary Differential Equations, Springer, USA.
Damanik, Asan. 2010: Fungsi-fungsi Khusus, Graha Ilmu, Yogyakarta
Dewi, Ratnadkk. 2013. Matematika Teknik, Rekayasa Sains, Bandung.
Morgan, Frank. 2005. Real Analysis and Applications, American Mathematical Society, USA.
Mursita, Danang. 2011: Matematika untuk Perguruan Tinggi, Rekayasa Sains, Bandung.
Stroud, KA. 2003: Matematika Teknik Jilid 2 Edisi 5 (Terj.), Penerbit Erlangga, Jakarta.

Mata Kuliah ***Course Name***	:	**Medan Elektromagnetik** ***Electromagnetic Field***
Kode Mata Kuliah ***Course Code***	:	**RTD212102** ***RTD212102***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** **2 *credits* / 3 *hours per week***
Semester ***Semester***	:	**2 (Dua)** ***2 (Two)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Setelah mengikuti mata kuliah ini mahasiswa diharapkan:
After taking this course students are expected to:

a. Menguasai konsep teoritis mengenai vektor dan sistem koordinat.
   Mastering the theoretical concepts of vectors and coordinate systems.
b. Menguasai konduktivitas, medan magnet, induksi magnet
   Mastering conductivity, magnetic field, magnetic induction
c. Menguasai Hukum Coulomb, Hukum Integral Ampere, Hukum Biot Savart dan implementasinya.
   Mastering Coulomb's Law, Ampere's Integral Law, Biot Savart's Law and its implementation.
d. Dapat mengaplikasikan teori tersebut dalam permasalahan bidang telekomunikasi yang berhubungan dengan medan listrik dan medan magnet.
   Can apply the theory in the field of telecommunications problems related to electric and magnetic fields.
e. Mahasiswa menguasai induksi magnetik pada *smart card* dan dapat mengaplikasikannya.
   Students master magnetic induction on smart cards and can apply it.

Pokok Bahasan
Main Subjects

1. Analisis Vektor
   Vector Analysis
2. Hukum Coulomb
   Coulomb's Law
3. Fluks Listrik, Energi dan Potensial Listrik
   Electric Flux, Electrical Energy and Potential
4. Arus dan Konduktivitas
   Current and Conductivity
5. Medan Magnet dan Induksi Magnet
   Magnetic Field and Magnetic Induction
6. Hukum Biot Savart dan Implementasinya
   Biot Savart's Law and Its Implementation
7. Persamaan Maxwell
   Maxwell's Equation
8. Hukum Integral Ampere
   Ampere's Integral Law
9. Perambatan Gelombang Elektromagnetik
   Electromagnetic Wave Propagation
10. Aplikasi Induksi Magnetik pada *Smart Card*
    Magnetic Induction Application on Smart Card

Referensi
Reference(s)

Hayt, William H. 2012. Engineering Electromagnetics Eight Edition. Mc-Graww Hill Company

Sadiku, Matthew NO. 2007. Element of Electromagnetic. Oxford University Press. New York

Thide, Bo. 2012. Electromagnetic Field Theory Second Edition. Swedish Institute of Space Physics, Uppsala Sweden

Mata Kuliah ***Course Name***	**:**	**Workshop Pemrograman Komputer** ***Workshop of Computer Programming***
Kode Mata Kuliah ***Course Code***	**:**	**RTD212103** ***RTD212103***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

1. Mahasiswa mampu memahami permasalahan sederhana dan menyelesaikan melalui pembuatan algoritma dan flowchart.
   Students are able to understand simple problems and solve them through making algorithms and flowcharts.
2. Mahasiswa mampu membangun program secara terstruktur menggunakan bahasa program C++/JAVA/VB/MATLAB/PHYTON.
   Students are able to build programs in a structured way using C++/JAVA/VB/MATLAB/PHYTON programming languages.

Pokok Bahasan
Main Subjects

1. Algoritma, Flowchart, dan Struktur Dasar Program
   Algorithm, Flowchart and Basic Programming Structure
2. Data dan Operator
   Data and Operator
3. Seleksi (If, if else, switch case), Perulangan (for, while, do while) dan Array
   Selection (If, if else, switch case), Iteration (for, while, do while) and Array
4. Matriks, Data string dan implementasinya (konversi bilangan)
   Matrix, String data and its implementation (number conversion)
5. Fungsi (return value, non return value, by reference)
   Function (return value, non return value, by reference)
6. Konsep OOP (Struktur data, Class, Variable private, public, dan overloading operator)
   OOP concept (Data structure, class, variable: private and public, operator overloading)
7. Operasi File (Filing System)
   File Operation (Filing system)
8. Pengenalan Program: Visual Basic, (C Builder), MATLAB, PHYTON, dan JAVA
   Introduction of Visual Basic, (C Builder), MATLAB, PHYTON, and JAVA program
9. Project
   Project

Referensi
Reference(s)

Yoyok. 2012. Dasar pemrograman C builder, Yoyok.
Budiyanto, Alex. 2004. Pengantar Algoritma dan Pemrograman. Pengantar Berseri Ilmu Komputer
Moh. Sjukani. 2005. Algoritma dan Struktur Data dengan C, C++, dan Java, Mitra Wacana Media.
Munir, Rinaldi. 2002. Algoritma dan Pemrograman dalam Bahasa Pascal dan C, Informatika Bandung
Prapitasari, LPA. 2007. Algoritma Pemrograman dan Struktur Data. STIMIK STIKOM Bali
Simon Harris and James Ross. 2006. Beginning Algorithms, Wiley Publishing Inc.
Satya Sai Kolachina. 2002. C++Builder™ 6 Developer's Guide.

Mata Kuliah ***Course Name***	**:**	**Praktikum Dasar Teknik Elektronika** ***Practicum of Electronic Devices and Engineering***
Kode Mata Kuliah ***Course Code***	**:**	**RTD212104** ***RTD212104***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menjelaskan rangkaian resonansi
   Students will be able to explain resonance circuit
b. Mahasiswa mampu menjelaskan rangkaian matching
   Students will be able to explain matching circuit
c. Mahasiswa mampu menjelaskan rangkaian penguat sinyal kecil

Students will be able to explain low signal amplifier

d. Mahasiswa mampu menjelaskan rangkaian penguat daya dan frequency multiplier
Students will be able to explain power amplifier and frequency multiplier circuits

e. Mahasiswa mampu menjelaskan rangkaian modulator, demodulator dan mixer
Students will be able to explain modulator, demodulator and mixer circuits

f. Mahasiswa mampu menjelaskan rangkaian filter
Students will be able to explain filter circuits

g. Mahasiswa mampu menjelaskan rangkaian sistem pemancar dan penerima
Students will be able to explain circuits for transmitter and receiver system

h. Mahasiswa mampu mendesain dan membuat produk rangkaian elektronika dasar (filter/modulator/demodulator/mixer)
Students will be able to design and build a basic electronic circuit (filter, modulator, demodulator and mixer)

Pokok Bahasan
Main Subjects

1. Rangkaian resonansi
   Resonance circuit
2. Rangkaian matching
   Matching circuit
3. Penguat sinyal kecil
   Low signal amplifier
4. Penguat daya dan frequency multiplier
   Power amplifier and frequencu multiplier
5. Modulator dan Demodulator
   Modulator and demodulator
6. Mixer
   Mixer
7. Filter
   Filter
8. Sistem pemancar dan penerima
   Transmitter and receiver system
9. Proyek
   Project

Referensi
Reference(s)

Main:

1. Neamen, 2007, *Microelectronics*, Mc. Graw Hill, 2007

Supplementary:

1. Sapiie Poynter, *Introducing Electronic Device and Circuit*, Prentice Hall, 2003
2. Foire, *Opamp and Linear Integrated Circuits*, Delmar, 2001

Mata Kuliah ***Course Name***	**:**	**Praktikum Rangkaian Listrik** ***Practicum of Electrical Circuit***
Kode Mata Kuliah ***Course Code***	**:**	**RTD212105** ***RTD212105***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***

Semester ***Semester***	**:**	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mengenali bentuk konfigurasi sumber tegangan searah (Direct Current) dan bolak balik (Alternating Current) saat digunakan dalam rangkaian elektronika, selain sumber berbentuk baterai.
Students recognize the configuration of direct current (direct current) and alternating current (alternating current) sources when used in electronic circuits, in addition to sources in the form of batteries.
b. Mahasiswa mampu melakukan pengukuran pada rangkaian elektronika dasar seperti Thevenin, Norton ataupun Superposisi.
Students are able to take measurements on basic electronic circuits such as Thevenin, Norton or Superposition.
c. Mahasiswa mempunyai kompetensi merancang, praktek merangkai dan menganalisa rangkaian-rangkaian listrik.
Students have the competence to design, practice assembling and analyzing electrical circuits.
d. Mahasiswa memahami analisa sinyal berbagai gelombang listrik.
Students understand signal analysis of various electric waves.
e. Mahasiswa mempunyai kompetensi menggunakan software simulator maupun secara manual menganalisis rangkaian
Students have the competence to use simulator software or manually analyzed the circuit
f. Mahasiswa mempunyai kompetensi membuktikan hukum-hukum rangkaian listrik di laboratorium.
Students have the competence to prove the laws of electric circuits in the laboratory.
g. Mahasiswa mampu menerapkan teorema rangkaian listrik pada proyek sederhana
Students are able to apply the electric circuit theorem in simple projects

Pokok Bahasan
Main Subjects

1. Rangkaian Resistor Seri.
Series Resistor Circuit.
2. Rangkaian Resistor Paralel.
Parallel Resistor Circuit.
3. Rangkaian Kombinasi Seri & Paralel
Series & Parallel Combination Circuit
4. Rangkaian Pembagi Tegangan tanpa Beban.
No-load Voltage Divider Circuit.
5. Pembagi Tegangan dengan beban.
Voltage divider with load.
6. Rangkaian Transformasi Y-Δ.
Y-Δ Transformation Circuit.
7. Rangkaian RL sinyal Sinus dan bukan Sinus.
Sine and non-Sine signal RL circuit.
8. Rangkaian RC sinyal Sinus dan bukan Sinus.
Sine and non-Sine signal RC circuit.
9. Rangkaian RLC.
RLC Circuit
10. Resonansi Seri dan Paralel
Series and parallel circuit
11. Proyek (Membuat Modul Sederhana menggunakan PCB hasil Bengkel Elektromekanik)

Project (Creating Simple Project using PCB from Electromechanical Workshop)

Referensi
Reference(s)

Chan, Shu-Park, The Electrical Engineering Handbook, CRC Press LLC, 2000
Charles K Alexander & MNO Sadiku, Fundamentals of Electric Circuits, Third Edition, 2009.
Hayt, William H., Jr., dan Jack E. E Kemmerly, 2005: Rangkaian Listrik Jilid 1 edisi keenam, Penerjemah Pantur Silaban, penerbit Erlangga.
Kuphaldt, Tony R., Lessons in Electric CircuitsVolume I – DC, 2004. Mahmood Nahvi & Joseph AE, Schaums Electric Circuits, McGraw-Hill, 2003. Mismail, Budiono, 2000. Rangkaian Listrik 2, Penerbit ITB.
Ramdhani, Muhamad, 2008: Rangkaian Listrik, Penerbit Erlangga.
Sudirham, Sudaryanto, Analisis Rangkaian Listrik Jilid 1(Analisis di kawasan waktu dan kawasan fasor), Darpublic, Bandung, 2012.
Wasif Naeem, Concepts In Electric Circuits, Ventus Publishing, 2009.

Mata Kuliah ***Course Name***	**:**	**Workshop Teknik dan Jaringan Komputer** ***Workshop of Computer Engineering and Networking***
Kode Mata Kuliah ***Course Code***	**:**	**RTD212106** ***RTD212106***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**3 sks / 6 jam per minggu** ***3 credits / 6 hours per week***
Semester ***Semester***	**:**	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa akan dapat terampil merancang, melakukan konfigurasi serta menganalisa sistem jaringan komputer sesuai dengan protokol yang berlaku.
Students will be able to skillfully design, configure and analyze computer network systems in accordance with applicable protocols.
b. Menjelaskan prinsip dasar model TCP/IP dan protokol perwakilan di setiap lapisan.
Explain the basic principles of the TCP/IP model and the protocol representation at each layer.
c. Menggunakan alat diagnostik jaringan untuk menganalisis mekanisme kerja dan kinerja layanan jaringan.
Use network diagnostic tools to analyze the working mechanism and performance of network services.
d. Menerapkan layanan komunikasi dasar menggunakan pemrograman soket.
Implement basic communication services using socket programming.
e. Memahami prinsip dasar keamanan jaringan: enkripsi kunci publik/pribadi, tanda tangan, hashing, Otentikasi pesan, Keamanan Email (PGP), pengamanan TCP (SSL), IPSec, dan VPN.
Understand the basic principles of network security: public/private key encryption, signatures, hashing, Message authentication, Email Security (PGP), TCP (SSL) security, IPSec, and VPN.
f. Mengetahui tantangan yang harus dipecahkan oleh teknologi jaringan masa depan.
Know the challenges that future network technologies will have to solve.

Pokok Bahasan

Main Subjects
1. Jaringan komputer dan internet *Computer network and internet* 2. Pengkabelan *Cabling* 3. Layer Aplikasi *Application Layer* 4. Layer Transport *Transport Layer* 5. Layer Network *Network Layer* 6. Jaringan Wireless dan Mobile *Wireless and Mobile Networks* 7. Jaringan Multimedia *Multimedia Network* 8. Manajemen Jaringan *Network Management*
Referensi ***Reference(s)***
Computer Networking: A Top-Down Approach Featuring the Internet, 7th edition, Jim Kurose and Keith Ross, Addison-Wesley Computer Networks: A Systems Approach, 4th Edition, Larry Peterson and Bruce Davie, 2007 TCP/IP Illustrated volume I and volume II Peter L. Dordal. An Introduction to Computer Networks. https://intronetworks.cs.luc.edu/ Andrew S. Tanenbaum and David J. Wetherall. Computer Networks. 5th Edition. 2011. Pearson.

Mata Kuliah ***Course Name***	**:**	**Praktikum Teknik Digital** ***Practicum of Digital Technique***
Kode Mata Kuliah ***Course Code***	**:**	**RTD212107** ***RTD212107***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**2 (Dua)** **2 (*Two*)**
Capaian Pembelajaran yang Dibebankan pada Mata Kuliah ***Learning Outcomes Imposed on Course***		
a. Mampu menerapkan dan mengoperasikan piranti dan rangkaian digital pada sistem digital. *Able to apply and operate digital devices and circuits in digital systems.* *b.* Mampu membuat rangkaian, mengukur dan menganalisis hasil kerja sesuai dengan standar yang berlaku. *Able to design and implement circuits, measure and analyze work results in accordance with applicable standards.*		
Pokok Bahasan ***Main Subjects***		

1. Praktik Rangkaian terintegrasi (Integrated Circuit/IC) Digital
   Practicum of Digital Integrated Circuit (IC)
2. Praktik Gerbang Logika Dasar (OR, AND, NOT, NOR, NAND, XOR, XNOR)
   Practicum of Basic Logic Gates (OR, AND, NOT, NOR, NAND, XOR, XNOR)
3. Praktik Aljabar Boolean dan Teori De Morgan
   Practicum of Boolean Algebra and De Morgan's Theory
4. Praktik Rangkaian Logika Pengolah Data (Encoder, Decoder, Multiplexer dan Demultiplexer)
   Practicum of Data Processing Logical Circuits (Encoder, Decoder, Multiplexer and Demultiplexer)
5. Praktik Rangkaian Aritmatika (Adder, Comparator, ALU)
   Practicum of Arithmetic Circuits (Adder, Comparator, ALU)
6. Praktik Flip – Flop (Set-Reset, JK, Data dan Toggle)
   Practicum of Flip – Flop (Set-Reset, JK, Data and Toggle)
7. Praktik Pencacah (Counter) Serial dan parallel
   Practicum of Serial and parallel counter
8. Praktik Register (PIPO, SIPO, PISO, SISO)
   Practicum of Register (PIPO, SIPO, PISO, SISO)
9. Praktik Rangkaian Adder dan Subtractor
   Practicum of Adder and Subtractor Circuit
10. Praktik Rangkaian Decoder dan Encoder
    Practicum of Decoder and Encoder Circuit
11. Praktik Konverter Sinyal (ADC & DAC).
    Practicum of Signal Converter (ADC & DAC).

Referensi
Reference(s)

Chirlian PM., Analysis and Design of Integrated Circuit, Prentice Hall, 2008 Hall, Douglas V. Microprocessor and Digital System, Singapore, 1993

Hill, F. J. and Peterson, G. R. Switching Theory and Logical Design. New York: John Wiley & Sons, Inc. 1993

Malvino, A. P. and Brown J. A. Digital Computer Electronics. Lake Forest. Glencoe Division of Macmillan / McGraw-Hill School Publishing Company. 1999.

Mano, M. M. Computer System Architecture (3rd Edition). Englewood Cliff. Prentice Hall, Inc. 1992 Mismail, B. Dasar – Dasar Rangkaian Logika Digital. Bandung: Penerbit ITB. 1998

Murdocca, M. and Heuring, V.P. Principles of Computer Architecture. Englewood Cliff: Prentice Hall. 1999 National Semiconductor, Logic Data Book, ----

Samuel C. Lee, Digital Circuit and Logic Design, Prentice Hall, 2006

Sicard, E. and Xi, C. Dsch2 Commands. Http://intrage.insa-tise.fr/~etienne.2003

Smith, R. J. and Dorf, R. C. Circuits, Devices and Systems. New York. John Wiley & Sons. 1992 Texas Instrument, Designing with TTL IC, 2006

Tocci R. J. & Widmer, R.S. Digital Systems, Principle and Application, 8th Edition. Englewood Cliff. Prentice Hall, 2001

Widjanarka, Wijaya, Teknik Digital, Erlangga, Jakarta, 2006

William Stalling, Computer Organization and Architecture, Prentice Hall, 5Th ed, 2000.

Mata Kuliah ***Course Name***	**:**	**Saluran Transmisi & Gelombang Mikro** ***Microwave and Transmission Line***
Kode Mata Kuliah ***Course Code***	**:**	**RTD212108** ***RTD212108***

Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	**:**	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menerapkan pengetahuan terkait dengan materi saluran transmisi kawat, waveguide, microstrip dan stripline.
Capable to apply knowledge of wire transmission line, waveguide, microstrip and stripline.
b. Mampu menganalisa pemakaian saluran transmisi kawat, waveguide, microstrip dan stripline.
Capable to analyze the use of wire transmission lines, waveguide, microstrip and stripline.
c. Mampu merancang dan mengimplementasikan saluran transmisi kawat, waveguide, microstrip dan stripline yang memenuhi kriteria desain yang ditetapkan dengan mempertimbangkan standar teknis, aspek kinerja, keandalan, kemudahan penerapan.
Capable to design and implement wire transmission lines, waveguide, microstrip and stripline in accordance with the design criteria by considering technical standards, performance aspects, reliability, ease of application

Pokok Bahasan
Main Subjects

1. Dasar saluran transmisi, meliputi; definisi, jenis, parameter dan implementasi saluran transmisi pada sistem telekomunikasi
Basic transmission line, including; definition, types, parameters and implementation of transmission lines in telecommunications systems
2. Persamaan saluran transmisi tanpa rugi-rugi dan merugi (Lossy)
Equation of lossless and lossy transmission lines
3. Sinyal Transient pada saluran transmisi
Transient signal on Transmission lines
4. Aplikasi Smithchart
Smithchart application
5. Matching Impedansi pada saluran transmisi, meliputi; Transformator 1/4 lambda, single stub Tuner, dan double stub Tuner
Impedance matching on transmission lines, including; quarter-wave transformers, single stub tunner, and double stub tunner
6. Konsep Saluran Transmisi waveguide, meliputi; Wavegude Persegi, Waveguide Silinder, dan Desain serta implementasi Saluran transmisi Waveguide
Concepts of waeguide transmission lines, including; rectangular waveguide, circular waveguide, Design and implementation of waveguide transmission lines.
7. Konsep, desain dan implementasi Mikrostrip dan stripline
Concepts, design and implementation of Microstrip and stripline

Referensi
Reference(s)

G.S.N. Raju, 2006, "Electromagnetic Field Theory and Transmission Lines", India.
Andrew F. Peterson, 2009, "Transient signals on Transmission Lines", Georgia.
F. A. Benson, 1991, "Fields, Waves and Transmission Lines", 1st Edition, USA
Brian C. Wadell, 1991, Transmission Line design handbook, USA

Mata Kuliah *Course Name*	**:**	**Sistem Modulasi dan Multiplexing** ***Modulation System and Multiplexing***
Kode Mata Kuliah *Course Code*	**:**	**RTD212109** ***RTD212109***
Jumlah sks/ Jam per minggu *Number of credits/ Hours per week*	**:**	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester *Semester*	**:**	**2 (Dua)** **2 (*Two*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menuliskan bentuk persamaan sinyal termodulasi analog: AM (Amplitude Modulation), FM (Frequency Modulation) dan PM (Phase Modulation) serta mampu menghitung semua parameter sinyal yang ditentukan
Students are able to write equations for analog modulated signals: AM (Amplitude Modulation), FM (Frequency Modulation) and PM (Phase Modulation) and are able to calculate all the specified signal parameters

b. Mahasiswa mampu mengkonversi sinyal analog ke digital (ADC) dalam sistem PCM serta mampu menghitung parameter kesalahan kuantisasi, step size serta perbandingan sinyal terhadap noise (S/N)
Students are able to convert analog signals to digital (ADC) in the PCM system and are able to calculate quantization error parameters, step size and signal to noise ratio (S/N)

c. Mahasiswa mampu menjelaskan dan menghitung bandwidth dari sinyal PAM (Pulse Amplitude Modulation), PWM (Pulse Width Modulation), PPM (Pulse Position Modulation), DM (Delta Modulation)
Students are able to explain and calculate the bandwidth of PAM (Pulse Amplitude Modulation), PWM (Pulse Width Modulation), PPM (Pulse Position Modulation), DM (Delta Modulation) signals

d. Mahasiswa mampu menuliskan persamaan dan menganalisa sinyal termodulasi digital: ASK (Amplitude Shift Keying Modulation), FSK (Frequency Shift Keying) dan PSK (Phase Shift Keying) serta menghitung semua parameter sinyal yang ditentukan
Students are able to write equations and analyze digitally modulated signals: ASK (Amplitude Shift Keying Modulation), FSK (Frequency Shift Keying) and PSK (Phase Shift Keying) and calculate all the specified signal parameters

e. Mahasiswa mampu menguasai modulasi pada teknologi seluler GSM dan GPRS yang menggunakan modulasi GMSK (Gaussian Minimum Shift Keying).
Students are able to master modulation on GSM and GPRS cellular technology using GMSK (Gaussian Minimum Shift Keying) modulation.

f. Mahasiswa mampu menguasai modulasi pada teknologi seluler EDGE yaitu modulasi 8-PSK
Students are able to master modulation on EDGE cellular technology, which is 8-PSK modulation

g. Mahasiswa mampu menguasai modulasi pada teknologi WCDMA (Wideband Code Division Multiple Access) yang menggunakan modulasi QPSK (Quadrature Phase Shift Keying) pada arah downlink.
Students are able to master modulation on WCDMA (Wideband Code Division Multiple Access) technology which uses QPSK (Quadrature Phase Shift Keying) modulation in the downlink direction

h. Mahasiswa mampu menguasai modulasi pada teknologi HSDPA (High Speed Downlink Packet Access) yang menggunakan modulasi QPSK atau 16 QAM pada arah downlink.
Students are able to master modulation on HSDPA (High Speed Downlink Packet Access) technology which uses QPSK or 16 QAM modulation in the downlink direction

i. Mahasiswa mampu menguasai modulasi pada teknologi LTE yang mengadopsi teknologi AMC

(Adaptive Modulation and Coding)
Students are able to master modulation on LTE technology that adopts AMC technology (Adaptive Modulation and Coding)

j. Mahasiswa mampu memahami dan menganalisa BER (bit error rate) dan Pe (probability of error) dari sinyal termodulasi digital.
Students are able to understand and analyze BER (bit error rate) and Pe (probability of error) of digital modulated signals.

k. Mahasiswa mampu menganalisis demodulator modulasi digital.
Students are able to analyze digital modulation demodulator.

l. Mahasiswa mampu menjelaskan perbedaan teknik multipleksing teknologi seluler (FDM, TDM, OFDM) dan optik (WDM) serta teknik multiple aksesnya
Students are able to explain the differences in cellular technology (FDM, TDM, OFDM) and optical (WDM) multiplexing techniques and their multiple access techniques

m. Mahasiswa mampu menjelaskan teknik diversitas spasial, MIMO, MU-MIMO
Students are able to explain spatial diversity techniques, MIMO, MU-MIMO

Pokok Bahasan
Main Subjects

1. Modulasi analog (AM, FM dan PM) dan Modulasi digital (ASK, FSK dan PSK) dan turunannya
Analog modulation (AM, FM and PM) and digital modulation (ASK, FSK and PSK) and their derivatives
2. Pembangkitan dan penerimaan sinyal termodulasi analog
Transmitting and receiving of analog modulated signals
3. Teorema Sampling dan konversi analog ke digital
Sampling Theorem and analog to digital conversion
4. BER dan Pe (Probability error) modulasi digital
BER and Pe (Probability error) digital modulation
5. Konsep formatter terdiri sampling quantising dan coding (PCM dan m-ary berupa PAM, PPM, PWM, DM)
The formatter concept consists of sampling, quantizing, and coding (PCM and m-ary in the form of PAM, PPM, PWM, DM)
6. Modulasi pada teknologi seluler: GMSK, 8-PSK, QPSK, 16 QAM, dan AMC
Modulation on cellular technology: GMSK, 8-PSK, QPSK, 16 QAM, and AMC
7. Multipleksing (FDM, TDM, WDM, OFDM, MIMO OFDM) dan diversitas spasial (MIMO)
Multiplexing (FDM, TDM, WDM, OFDM, MIMO OFDM) and spatial diversity (MIMO)

Referensi
Reference(s)

Bernard Sklar, Digital communications: Fundamentals and Applications, Prentice Hall, 2001

Hwei Hsu, Ph.D., 2003, Schaum's outline of theory and problems of Analog and Digital Communications, 2nd Edition, Mc-Graw Hill.

John G. Proakis, 1995, Digital communications, 3rd Edition, Mc-Graw Hall.

Dennis Roddy & John Coolen, Electronic Communication, Reston Pbl. Com.Inc, third edition, Ontario Canada, 1984.

Leon W. Cough II, Digital and Analog Communication Systems, Macmillan Publishing Company, New York.

Sanjay Sharma, Communication System (analog & digital), S.K. Kataria & Sons, third edition, New Delhi, 2005

Simon Haykin, Communication System, John Wiley & Sons, Inc, 4th edition, 2001 Wayne Tomasi, Digital Communication System, John Wiley

Mata Kuliah ***Course Name***	:	**Bahasa Inggris II** ***English II***
Kode Mata Kuliah ***Course Code***	:	**RTD213001** ***RTD213001***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	:	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu mendengarkan dan memahami percakapan sehari-hari dan informasi lisan dalam Bahasa Inggris dengan baik.
Students are able to listen and understand daily conversation and spoken information in English properly.
b. Mampu menggunakan strategi komunikasi dan menyampaikan informasi sesuai dengan tujuan dan konteks secara efektif.
Students are able to use information strategy and expressing information according to the purpose and context effectively.
c. Mampu memahami konvensi komunikasi Bahasa Inggris lisan ermasuk tata bahasa, pilihan kata, register, kecepatan dan gerak tubuh agar dapat menjadi pembicara dan pendengar yang baik.
Students comprehend spoken English convention including grammar, vocabulary, registry speed, and body language in accordance to a good listener.
d. Mampu mengintegrasikan informasi dari mendengarkan informasi dalam Bahasa Inggris dengan pengetahuan sebelumnya untuk memahami dan menarik kesimpulan.
Able to integrate informasion from listening to information in English with prior knowledge to make a conclusion.
e. Mampu membuat pernyataan, pertanyaan, perintah dan saran seperti menyanggah, menolak, menyampaikan persetujuan, argument dan kemungkina dalam dialog, percakapan telepon dan presentasi.
Ability to make a statement, question, order, and suggestion such as objection, rejection and confessing agreement, argument and possibilities in dialog, telephonic conversation, and presentation.

Pokok Bahasan
Main Subjects

1. Percakapan Dasar
Basic Conversation
2. Bahasa Inggris untuk Menelepon
English for Telephoning
3. Bahasa Inggris untuk Presentasi
English for Presentation
4. Bahasa Inggris untuk Rapat
English for Meeting
5. Cara Negosiasi dalam Bahasa Inggris
How to Negotiate in English
6. Bahasa Inggris untuk Email dan Surat
English for Emails and Letter

Referensi
Reference(s)

Oxford English for Telephoning (Express Series)
Oxford English for Presentation (Express Series)
Oxford English for Meeting (Express Series)
Oxford English for Negotiation (Express Series)
Oxford English for Emails and Letter (Express Series)

Mata Kuliah ***Course Name***	**:**	**Pendidikan Agama** ***Religious Education***
Kode Mata Kuliah ***Course Code***	**:**	**RTD213002** ***RTD213002***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	**:**	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Memperkuat iman dan takwa kepada Allah SWT.
Strengthening faith and piety to Allah SWT.
b. Mengembangkan Akhlak mulia dan peka terhadap lingkungannya.
Develop noble character and be sensitive to the environment.
c. Mengembangkan penalaran yang baik, berpikir kritis, dan menjadikan nilai-nilai Islam untuk mengenali berbagai masalah aktual dan memecahkannya.
Develop good reasoning, critical thinking, and apply Islamic values to recognize actual problems and solve them.
d. Memiliki wawasan yang luas dan mengenali berbagai perubahan dimasyarakat serta mampu mengambil keputusan dan sikap secara bertanggung jawab sesuai dengan nilai nilai islam yang diyakininya.
Has broad insight and recognizes various changes in society and is able to take decisions and attitudes responsibly in accordance with the Islamic values student believes in.
e. Melakukan komunikasi dengan baik, bersikap mandiri dan toleran dolam mengembangkan kehidupan yang harmonis antar umat beragama.
Communicate well, to be independent and tolerant in developing a harmonious life between religious communities.
f. Menghantarkan mahasiswa mampu bersikap rasional dan dinamis dalam rangka mengembangkan dan memanfaatkan IPTEKS sesuai dengan nilai-nilai Islam bagi kepentingan bangsa dan umat manusia.
Escorting students to be able to act rationally and dynamically in order to develop and utilize science and technology in accordance with Islamic values for the benefit of the nation and mankind.

Pokok Bahasan
Main Subjects

1. Memahami alasan-alasan pentingya agama bagi kehidupan manusia
   Comprehend reasons of importance of religion for daily living
2. Memahami kedudukan agama Islam sebagai wahyu yang memberi petunjuk bagi kehidupan dan kehidupan manusia
   Comprehend the position of Islamic Religion as a revelation which give directions for daily live and human beings.
3. Menganalisis kalimat syahadat yang benar.
   Analizing syahadat in a correct manner.
4. Mampu menjelaskan dampak taukhid dalam kehidupan setiap hari
   Explaining the impact of taukhid in daily life.
5. Memahami prilaku perjuangan Rasullulah dengan membentuk kepribadian muslim.
   Understanding the behavior of Rasulullah struggle in shaping the muslim personality.
6. Menjelaskan kedudukan hakikat kehidupan manusia dalam Islam dan Mampu menjelaskan fungsi dan kehidupan manusia serta takdirnya.
   Explaining the foothold of reality of human living in Islam and able to explain the function and human life and their destiny.
7. Memahami manfaat alam semesta dalam Islam.
   Comprehend the merit of the universe in Islam.
8. Memahami hakikat ilmu pengetahuan dalam Islam.
   Comprehent the reality of science in Islam.
9. Menerapkan mekanisme pensucian diri, mampu menjelaskan dampak mendekatkan diri kepada Allah.
   Implementing the mechanism of self purification and ability to explain the impact of getting closer to Allah.
10. Mampu menjelaskan landasan etos kerja seorang muslim
    Ability to explain the base of work etiquette of a Muslim.
11. Mampu menyebutkan nilai-nilai Islam yang memberi semangat dalam pembangunan.
    Able to state the values of Islam where it gives spirit in development.
12. Memahami mekanisme proses pembentukan keluarga Sakinah Mampu menjelaskan pembinaan keluarga Sakinah.
    Comprehending the mechanism in the process of shaing a Sakinah Family and able to explain the guide to Sakinah family.

Referensi
Reference(s)

Fadloli dkk, 2014, Pendidikan Agama Islam Pada Perguruan Tinggi Umum, UPT MKU Politeknik Negeri Malang, Malang: Aditya Media Publishing

Hasanah, Uswah dkk 2003, Modul Acuan Proses Pembelajaran Mata Kuliah Pengembangan Kepribadian, Jakarta, Direktur Pembinaan Akademik dan Kemahasiswaan, Direktorat Jenderal Pendidikan Tinggi

Pendidikan Agama Islam Pada Perguruan Tinggi, 2002, Jakarta, Kasubdit Dan Ketenagaan Ditperta Islam

Mata Kuliah ***Course Name***	:	**Workshop Metode Numerik** ***Workshop of Numerical Method***
Kode Mata Kuliah ***Course Code***	:	**RTD213103** ***RTD213103***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**1 sks / 3 jam per minggu** ***1 credits / 3 hours per week***

Semester ***Semester***	**:**	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu memahami konsep analisis galat, reperesentasi bilangan dan teorema Taylor
Students are able to understand the concept of error analysis, number representation and Taylor's theorem
b. Mahasiswa mampu melakukan perhitungan persamaan akar
Students are able to calculate the root equation
c. Mahasiswa mampu menerapkan metode numerik untuk perhitungan persamaan linear dan non-linear
Students are able to apply numerical methods for calculating linear and non-linear equations
d. Mahasiswa mampu konsep dan malakukan perhitungan regresi dan interpolasi untuk perhitungan numerik
Students are able to conceptualize and perform regression and interpolation calculations for numerical calculations
e. Mahasiswa mampu melakukan perhitungan integrasi numerik, turunan numerik dan persamaan diferensial
Students are able to calculate numerical integration, numerical derivatives and differential equations

Pokok Bahasan
Main Subjects

1. Analisis galat, representasi bilangan dan teorema Taylor
Error analysis, number representation and Taylor's theorem
2. Persamaan akar: metode setengah interval dan interpolasi linier, metode Newton-Rapson, metode Secant, metode iterasi, diskretisasi numerical
Root equations: half interval method and linear interpolation, Newton-Rapson method, Secant method, iteration method, numerical discretization
3. Persamaan Non linear
Non-linear equation
4. Persamaan Linear
Linear equation
5. Regresi
Regression
6. Interpolasi: Linier dan Newton
Interpolation: Linear and Newton
7. Integrasi numerik: trapezoidal, Simpson 1/3, 3/8, kuadran Gauss
Numerical integration: trapezoidal, Simpson 1/3, 3/8, Gauss quadrant
8. Turunan numerik
Numerical derivative
9. Persamaan Differensial: ODE (metode Euler, metode Heun, metode ODE modifikasi (koreksi rangkap), poligon, metode Runge-Kutta) dan PDE (persamaan eliptik)
Differential Equations: ODE (Euler method, Heun method, modified ODE method (dual correction), polygons, Runge-Kutta method) and PDE (elliptic equations)

Referensi
Reference(s)

Greenbaum and T. P. Chartier. Numerical Methods: Design, Analysis and Computer Implementation of Algorithms. Princeton University Press, 2012.
W. H. Press, S. A. Teukolsky, W. T. Vetterling, B. P. Flannery. Numerical Recipes: The Art of Scientific Computing. Cambridge University Press, 2007.
L. R. Scott. Numerical Analysis. Princeton University Press, 2011.
E. Suli, D. F. Mayers. An Introduction to Numerical Analysis. Cambridge University Press, 2003.

Mata Kuliah ***Course Name***	**:**	**Antena** ***Antenna***
Kode Mata Kuliah ***Course Code***	**:**	**RTD213104** ***RTD213104***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 3 jam per minggu** ***2 credits / 3hours per week***
Semester ***Semester***	**:**	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menjelaskan syarat terjadinya mekanisme radiasi antena.
Students will be able to explain radiation mechanism
b. Mahasiswa mampu menjelaskan parameter-parameter antena dan metode pengukurannya.
Student will be able to explain antenna parameters and how to measure them.
c. Mahasiswa mampu mendesain antena *dipole*, *parasitic array* dan *microstrip* serta serta menyimulasikannya.
Students will be able to design dipole, parasitic array and microstrip antenna and simulate the designs.
d. Mahasiswa mampu menjelaskan parameter antena reflector.
Student will be able to explain reflector antenna parameter.
e. Mahasiswa mampu menjelaskan perkembangan antena terkini.
Student will be able to explain "state of the art" in antenna technology.

Pokok Bahasan
Main Subjects

1. Definisi Antena, Tipe Antena dan aplikasinya
Definition, type and antenna application
2. Mekanisme radiasi antena
Radiation mechanism
3. Parameter dan metode pengukuran antena
Antenna parameters and how to measure them.
4. Mendesain dan menyimulasikan hasil desain antena (*dipole*, *parasitic array, microstrip*)
Design and simulation dipole, parasitic array and microstrip antenna.
5. Smart antenna
Smart antenna

Referensi
Reference(s)

Main:
1. Balanis, Constantine A., *Antenna Theory : Analysis and Design*, John Wiley and Sons, 2005.
2. Milligan, Thomas A., *Modern Antenna Design*, , John Wiley and Sons, 2005.

Supplementary:
1. Ulaby, Fawwaz T., Fundamentals of Applied Electromagnetics 5th edition,Pearson, 1994
2. Hong, Y.W. Peter, Cooperative Communications and Networking : Technologies and System Design, Springer, 2010
3. www.antenna-theory.com
4. Okamoto, Garret T., Smart Antenna Systems And Wireless LANs, Kluwer Academic Publishers, 2002.
5. https://www.cst.com/academia/examples
6. http://www.changpuak.ch/electronics/

Mata Kuliah ***Course Name***	:	**Pemrosesan Sinyal Digital** ***Digital Signal Processing***
Kode Mata Kuliah ***Course Code***	:	**RTD213105** **RTD213105**
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**3 (Tiga)** ***3(Three)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Setelah mengikuti mata kuliah Pemrosesan Sinyal Digital, mahasiswa diharapkan mengetahui dasar dan pengolahan sinyal dan sistem serta mampu menganalisanya dengan berbagai macam metoda, baik untuk sinyal kontinyu maupun diskrit.
After taking digital signal processing courses, students are expected to know the basics and processing of signals and systems and be able to analyze them with various methods, both for continuous and discrete signals.

Pokok Bahasan
Main Subjects

1. Perbedaan sinyal analog dan sinyal digital
   The difference of analog signal and digital signal
2. Operasi dasar sinyal (pergeseran, penskalaan, pembalikan, penjumlahan, pengurangan, perkalian, pembagian)
   Basic operation in Signal (shifting, scaling, inverse, addition, subtraction, multiply, division)
3. Sifat sistem (kausalitas, linearitas, time invariant/variant)
   System (Causality, Linearity, Time-invariant / variant)
4. Konvolusi
   Convolution
5. Transformasi Fourier dan inverse fourier
   Fourier Transformation and Fourier inverse
6. Transformasi Z
   Z transformation
7. Filter digital
   Digital filter

Referensi
Reference(s)

Hans J. W., (penerjemah), 1996, "Sinyal dan Sistem Linier", Edisi ke-3, Erlangga, Jakarta.
O'Flynn M., Moriarty, E., 1987, "Linear Systems, Time Domain and Transform Analysis",
Robert, M. J., "Signal and System" , McGraw Hill, New York.
Simon H., Barry V. V., 2004, "Signal and System", John Wiley & Son, New York.
Michael Corinthios, "Signals, Systems, Transform, and Digital Signal Processing with MATLAB", Taylor and Francis Group, LLC, 2009.
Tadeusz A. Wysocki, Bahram Honary, and Beata J. Wysocki, "Signal Processing for Telecommunications and Multimedia", Springer, London, England, 2005.
Gordon E. Carlson, "Signal and Linear System Analysis, a Matlab tutorial", Prentice Hall, 2nd Edition, Usa 2000.

Mata Kuliah ***Course Name***	:	**Workshop Rekayasa Trafik** ***Workshop of Traffic Engineering***
Kode Mata Kuliah ***Course Code***	:	**RTD213106** ***RTD213106***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 5 jam per minggu** ***2 credits / 5 hours per week***
Semester ***Semester***	:	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu memahami konsep dasar probabilitas dan statistic yang digunakan untuk rekayasa trafik.
   Students are able to understand the basic concepts of probability and statistics used for traffic engineering.
b. Mahasiswa mampu memahami konsep dan perkembangan rekayasa trafik telekomunikasi
   Students are able to understand the concept and development of telecommunication traffic engineering.
c. Mahasiswa mampu memahami besaran trafik dan satuannya.
   Students are able to understand the amount of traffic and its units.

d. Mahasiswa mampu melakukan perhitungan model teletrafik.
Students are able to calculate teletraffic model.
e. Mahasiswa mampu menganalisis sistem rugi trafik dan sistem antrean trafik.
Students are able to analyze the traffic loss system and the traffic queue system.
f. Mahasiswa mampu menerapkan rekayasa trafik dalam merencanakan jaringan telekomunikasi.
Students are able to apply traffic engineering in planning telecommunication networks.
g. Mahasiswa mampu melalukan pengukuran QoS pada software wireshark.
Students are able to perform QoS measurements on wireshark software.

Pokok Bahasan
Main Subjects

1. Konsep dasar probabilitas & statistik (random variabel, distribusi gausian, distribusi poisson, distribusi eksponensial)
The basic concept of probability & statistics (random variables, gausian distribution, Poisson distribution, exponential distribution
2. Konsep Dasar Trafik
The bacis concept of traffic
3. Besaran trafik dan satuannya
The amount of traffic and its units
4. Model Teletrafik
Teletraffic Model
5. Sistem Rugi dan Antrean Trafik
The Loss System and Traffic Queue
6. Kapasitas trafik dan kualitas layanan
Traffic capacity and service quality
7. Pengukuran QoS pada software wireshark
QoS measurement on wireshark software

Referensi
Reference(s)

Bellamy, John C., Digital Telephony, London, John Wiley and Sons, 1991
Teletraffic Engineering Handbook, ITU-D, Geneva, 2003.
Chappell, Laura, Wireshark Network Analysis, 2012
Stallings, William, ISDN and Broadband ISDN with Frame Relay and ATM, Prentice Hall International, Inc. 1995, Third Edition
J. Floood, Telecommunication, Switching, Traffic and Networks, Prentice Hall, 1994.

Mata Kuliah ***Course Name***	:	**Workshop Mikrokontroler** ***Workshop of Microcontroller***
Kode Mata Kuliah ***Course Code***	:	**RTD213107** ***RTD213107***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**3 sks / 6 jam per minggu** ***3 credits / 6 hours per week***
Semester ***Semester***	:	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mensimulasikan aplikasi program untuk Mikrokontroler AVR Arduino Uno untuk unit input-output, unit ADC, dan unit USART dengan menggunakan software Codevision AVR dan Proteus dan di akhir perkuliahan mahasiswa.
Simulation application program for Arduino Uno microcontroller for input-ouput, ADC and USART unit utilizing Codevision AVR and Proteus at the end of the course.
b. Mampu membuat proposal proyek yang akan di implementasikan di masyarakat dengan bidang mikrokontroler.
Ability to create a project proposal in the field of microcontroller in which will be implemented in the civilization.

Pokok Bahasan
Main Subjects

1. Pengenalan komponen-komponen modul rangkaian Mikrokontroler Arduino Uno
Introduction to components module in Arduino Uno Microcontroller
2. Pembuatan program pada modul rangkaian Mikrokontroler ATMega untuk aplikasi input-output meliputi rangkaian saklar dan 7 segmen
Developing program in ATMega circuit module for switch and 7 segment input-output
3. Pembuatan program pada modul rangkaian Mikrokontroler ATMega untuk aplikasi ADC meliputi rangkaian potensiometer, LDR dan 7 segmen
Developing program in ATMega circuit module for ADC which covers potensiometer circuit, LDR and 7 segments
4. Pembuatan program pada modul rangkaian Mikrokontroler ATMega untuk aplikasi USART meliputi telekontrol dan telemetri
Developing program for ATmega circuit module for USART application which covers telecontrol and telemetri
5. Pembuatan proposal dan simulasi proyek mikrokontroler untuk di aplikasikan di masyarakat
Creating a proposal and microcontroller project simulation where it can be applied in civilization

Referensi
Reference(s)

Azam Muzakhim I, 2012, Modul Ajar Mikrokontroler dan Interfacing, Politeknik Negeri Malan
Azam Muzakhim I, 2012, Modul Praktikum Mikrokontroler dan Interfacing, Politeknik Negeri Malang
Andrianto, Heri, 2008, Pemrograman Mikrokontroler AVR ATMega16, Informatika' Bandung'
Widodo Budiharto, 2008, Panduan Praktikum Mikrokontroler AVR ATmega16, Elex Media Komputindo, Jakarta
Agfianto Eko Putra dan Dhani Nugraha, 2010, Tutorial Pemrograman Mikrokontroler AVR dengan WinAVR GCC (ATMega16/32/8255), Jogyakarta.
Syahban Rangkuti, 2011, Mikrokontroler ATMEL AVR (ISIS Proteus dan CodeVisionAVR), Informatika, Bandung.

Mata Kuliah : IoT dan WSN

Course Name		***IoT and WSN***
Kode Mata Kuliah ***Course Code***	:	**RTD213108** ***RTD213108***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mengetahui konsep IoT dan WSN
Knowing the concept of IoT and WSN
b. Menerapkan IoT dan WSN
Implementing IoT and WSN
c. Mengetahui masalah keamanan IoT
Knowing IoT security issues

Pokok Bahasan
Main Subjects

1. Pengenalan modul, konsep dasar dalam domain Internet of Things
Introduction to modules, basic concepts in the Internet of Things domain
2. Teknik IoT Lapisan Aplikasi
Application Layer IoT Engineering
3. Teknik IoT Lapisan Fisik
Physical Layer IoT Techniques
4. Aplikasi IoT
IoT Application
5. Protokol dan arsitektur : 6LowPAN, CoAp, ETSI M2M, and W3C SSN
Protocol and architecture : 6LowPAN, CoAp, ETSI M2M, and W3C SSN
6. Jaringan dan Komunikasi (Jaringan Multi-hop Nirkabel (WMN), Jaringan Ad-hoc Seluler (MANET), Jaringan Sensor Nirkabel (WSN)
Network and Communication (Wireless Multi-hop Network (WMN), Mobile Ad-hoc Network (MANET), Wireless Sensor Network (WSN)
7. Platform dan layanan perangkat lunak
Software platforms and services
8. Pemrosesan Data Pintar dan teknologi Semantik
Smart Data Processing and Semantic technology
9. Menghubungkan berbagai hal ke Web
Connecting things to the Web
10. Masalah dan solusi Keandalan, Keamanan, Privasi, dan Kepercayaan
Reliability, Security, Privacy and Trust issues and solutions
11. Aplikasi, Model sistem, Standar, dan sistem Fisik-Siber-Sosial
Applications, System models, Standards and Physical-Cyber-Social systems

Referensi
Reference(s)

Hans J. W.

Mata Kuliah ***Course Name***	:	**Praktikum Saluran Transmisi dan Gelombang Mikro** ***Practicum of Transmission Line & Microwave***
Kode Mata Kuliah ***Course Code***	:	**RTD213109** ***RTD213109***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	:	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menjelaskan karakteristik saluran transmisi kawat, waveguide, microstrip dan stripline
Capable to explain wire transmission line characteristic, waveguide, microstrip and stripline
b. Mampu menganalisa pemakaian saluran transmisi kawat, waveguide, microstrip dan stripline
Capable to analize the use of wire transmission line, waveguide, microstrip and stripline
c. Mampu merancang dan mengimplementasikan saluran transmisi kawat, waveguide, microstrip dan stripline yang memenuhi kriteria desain yang ditetapkan dengan mempertimbangkan standar teknis, aspek kinerja, keandalan, kemudahan penerapan
Capable to design and implement wire transmission lines, waveguide, microstrip and stripline in accordance with the design criteria by considering technical standards, performance aspects, reliability, ease of application

Pokok Bahasan
Main Subjects

1. Pengukuran Nilai Impedansi Karakteristik Zo Saluran dan redaman saluran transmisi koaksial didasarkan atas nilai R, L, C dan G
Measuring the Characteristic Impedance (Zo) and the attenuation of the coaxial transmission line based on R, L, C and G values
2. Pengukuran nilai Impedansi Input dan gelombang berdiri tegangan pada saluran transmisi koaksial, untuk beban Open, short dan Matching
Measuring the input impedance and voltage standing wave on coaxial transmission line for Open, short, and matched loads
3. Menguji saluran transmisi putus dengan teknik gelombang berdiri
Testing the broken transmission lines and Standing wave technique
4. Menguji Sinyal Transient pada saluran transmisi untuk beban Open, Short dan Matching
Testing Transient Signals on transmission lines for Open, Short and Matched loads
5. Pengukuran Nilai distribusi tegangan sepanjang waveguide dan panjang gelombang sebagai fungsi dari konstanta dielektrik
Measuring the value of the voltage distribution along the waveguide and the wavelength as a function of the dielectric constant
6. Pengukuran nilai redaman dan pantulan yang terjadi pada waveguide
Measuring the values of attenuation and reflection that occur in the waveguide
7. Pengukuran karakteristik gelombang berdiri tegangan dan nilai VSWR pada waveguide
Measuring the characteristic of voltage standing wave and VSWR value in waveguide
8. Proyek desain, simulasi, implementasi saluran transmisi dan microstrip & stripline
Design project, simulation, implementation of transmission lines and microstrip & stripline

Referensi
Reference(s)

G.S.N. Raju, 2006, "Electromagnetic Field Theory and Transmission Lines", India.
Andrew F. Peterson, 2009, "Transient signals on Transmission Lines ", Georgia.
F. A. Benson, 1991, "Fields, Waves and Transmission Lines", 1st Edition, USA
Brian C. Wadell, 1991, Transmission Line design handbook, USA

Mata Kuliah ***Course Name***	**:**	**Praktikum Sistem Modulasi dan Multiplexing** ***Practicum of Modulation System and Multiplexing***
Kode Mata Kuliah ***Course Code***	**:**	**RTD213110** ***RTD213110***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**3 (Tiga)** **3 (*Three*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Mahasiswa dapat mengaplikasikan teknik-teknik modulasi, multipleksing dan diversitas baik berbasis MATLAB maupun mengimplementasikannya dalam proyek sederhana sehingga didapatkan teknik transmisi sinyal yang optimal.
Students can apply modulation, multiplexing and diversity techniques both based on MATLAB and implement them in simple projects so that optimal signal transmission techniques are obtained.

Pokok Bahasan
Main Subjects

1. Pengantar Matlab
   Introduction to Matlab
2. Perencanaan dan rekayasa teknik modulasi dan demodulasi analog (Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM) dan m-ary)
   Planning and implementation of analog modulation and demodulation techniques (Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM) and m-ary)
3. Perencanaan dan rekayasa teknik modulasi dan demodulasi digital koheren (Frequency Shift Keying (FSK), Phase Shift Keying (PSK) dan m-ary), dan non koheren (Amplitude Shift Keying (ASK) dan m-ary QAM)
   Planning and implementation of coherent digital modulation and demodulation techniques (Frequency Shift Keying (FSK), Phase Shift Keying (PSK) and m-ary), and non-coherent (Amplitude Shift Keying (ASK) and m-ary QAM)
4. Rekayasa konsep formatter terdiri sampling quantising dan coding (PCM dan m-ary berupa PAM, PPM, PWM, DM)
   Formatter concept implementation consists of sampling quantising and coding (PCM and m-ary in the form of PAM, PPM, PWM, DM)
5. Desain pemancar dan penerima teknik multicarrier (OFDM), Teknik Multipleksing (FDM, TDM, WDM) dan diversitas spasial (MIMO)
   Design of transmitters and receivers of multicarrier (OFDM), Multiplexing (FDM, TDM, WDM) and spatial diversity (MIMO) techniques
6. Proyek

Project

Referensi
Reference(s)

Bernard Sklar and Pabitra Kumar Ray, 2014, Digital communications: Fundamentals and Applications, 2nd Edition, PEARSON.
Hwei Hsu, Ph.D., 2003, Schaum's outline of theory and problems of Analog and Digital Communications, 2nd Edition, Mc-Graw Hill.
John G. Proakis, 1995, Digital communications, 3rd Edition, Mc-Graw Hall.
Dennis Roddy & John Coolen, 1984, Electronic Communication, Reston Pbl. Com.Inc, third edition, Ontario Canada.
Leon W. Cough II, Digital and Analog Communication Systems, Macmillan Publishing Company, New York.
Sanjay Sharma, 2005, Communication System (analog & digital), S.K. Kataria & Sons, third edition, New Delhi.
Simon Haykin, 2001, Communication System, John Wiley & Sons, Inc, 4th edition. Wayne Tomasi, Digital Communication System, John Wiley

Mata Kuliah ***Course Name***	:	**Bahasa Inggris III** ***English III***
Kode Mata Kuliah ***Course Code***	:	**RTD214001** ***RTD214001***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**1 sks / 3 jam per minggu** ***1 credits / 3 hours per week***
Semester ***Semester***	:	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menjelaskan unsur-unsur kalimat dan membuat kalimat yang baik dan benar sesuai dengan tata bahasa baku bahasa Inggris.
Able to explain sentence elements and make good and correct sentences according to standard English grammar.
b. Mampu berbicara dan menyampaikan opini, argumentasi, pertanyaan, jawaban, dan atau sanggahan dalam kegiatan presentasi akademik.
Able to speak and convey opinions, arguments, questions, answers, and or rebuttals in academic presentation activities.
c. Mahasiswa mampu memahami percakapan (dialogue/conversation) dan ceramah (monologue) dalam bahasa Inggris.
Students are able to understand conversations (dialogue/conversation) and lectures (monologue) in English.

d. Mahasiswa dapat memahami pembuatan surat pribadi dan surat bisnis khususnya surat lamaran kerja dan daftar riwayat hidup serta siap wawancara dalam bahasa Inggris.
Students can understand the making of personal letters and business letters, especially job application letters and curriculum vitae and are ready for interviews in English.

Pokok Bahasan
Main Subjects

1. *Praktek Kerja Lapangan*
   On The Job Training (Field Work)
2. Telepon selular
   Cellphone
3. Surat Pribadi
   Personal Letter
4. Surat Bisnis
   Business Letter
5. Jaringan
   Networks
6. *Topik terbaru*
   The Newest Topic
7. Cara membuat buku Manual
   How to make Manual book
8. Surat Lamaran
   Application Letter
9. Riwayat Hidup
   Curriculum Vitae

Referensi
Reference(s)

English in Electrical and Electronics Engineering
English in Focus
Oxford English for Electronics
Word Power Books 1
English for the telecommunication industry

Mata Kuliah ***Course Name***	:	**Pendidikan Pancasila** ***Pancasila Education***
Kode Mata Kuliah ***Course Code***	:	**RTD214002** ***RTD214002***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	:	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu memahami dan menerapkan nilai-nilai Pancasila dalam kehidupan sehari-hari
Ability to understand and implements the values of Pancasila in daily life.
b. Menumbuhkan dan mengembangkan rasa kepekaan dalam menghadapi perubahan-perubahan yang terjadi di masyakat, bangsa dan negara.
Cultivate and develop a sense of sensitivity in the face of changes that occur in the community, nation, and country.

Pokok Bahasan
Main Subjects

1. Tujuan dan Landasan Pendidikan Pancasila
The purpose and foundation of Pancasila Education
2. Tinjauan Pancasila secara Ilmiah
Scientific approach of Pancasila
3. Historis, Kultural, Yuridis dan Filosofis
Historical, Cultural, Juridical and philosophical
4. Pertumbuhan Faham Kebangsaan di Indonesia
The growth of Nationalism in Indonesia
5. UUD 1945
1945 Constitution
6. Pancasila sebagai Sistem Filsafat
Pancasila as a Philosophical System
7. Pancasila Sistem Paradigma Politik Hukum
Pancasila as a Paradigm Political Law
8. Pancasila sebagai Ideologi
Pancasila as Idelogy
9. Pancasila dalam Konteks Ketatanegaraan Indonesia
Pancasila in the context of Indonesian state administration.
10. Pancasila dan Hak Asasi Manusia
Pancasila and Human Rights
11. Tindak Pidana Korupsi
Crime of Corruption

Referensi
Reference(s)

Direktorat Jenderal Pendidikan Tinggi Departemen Pendidikan Nasional, 2001, Kapita Selekta Pendidikan Pancasila, Bagian I, Dirjen Pendidikan Tinggi Departemen Pendidikan Nasional, Jakarta

Cahyadi, Antonius, 2007, Pengantar ke Filsafat Hukum, Kencana, Jakarta

El-Muhtaj, Majda, 2007, HAM dalam Konstitusi Indonesia, Kencana Prenada Media, Jakarta

Ihza Mahendra Yusril, 1999. Ideologi dan Negara, dalam Gazali, Yusril Ihza Mahendra, Tokoh Intelektual Muda, Rajawali, Jakarta.

Kaelan, 2002. Filsafat Pancasila Pandangan Hidup Bangsa Indonesia, Penerbit Paradigma, Yogyakarta.

_____, 2002. Pendidikan Pancasila, Edisi Reformasi 2002, Paradigma Yogyakarta

Mahfud, M.D., 2003, Demokrasi Dan Konstitusi Indonesia, Rineka Cipta, Jakarta.

Margono, dkk, 2002, Pendidikan Pancasila (Topik Aktual Kenegaraan dan Kebangsaan), Univ Negeri Malang, Malang

Soegito, A.T., 2000. Pancasila Aspek Historis, Semarang

Sujadi, R., 1999. Pancasila sebagai Sumber Tertib Hukum Indonesia, Lukman Offset, Yogyakarta

Surat Keputusan Direktur Jenderal Pendidikan Tinggi, Departemen Pendidikan Nasional Republik Indonesia Nomor: 38/DIKTI/Kep/2002 tentang Rambu-rambu Pelaksanaan Matakuliah Pengembangan Kepribadian di Perguruan Tinggi, Direktur Jenderal Pendidikan Tinggi, Jakarta.

Wibisono, Koento, 1998, Pancasila dalam Perspektif Gerakan Reformasi: Aspek Sosial Budaya, Makalah Diskusi Panel pada Pusat Studi Pancasila, Universitas Gadjah Mada, Yogyakarta.
UUD 1945 dan amandemennya dilengkapi susunan kabinet Indonesia Bersatu II 2009-20014, Sendang Biru, Solo
KPK, Buku Saku Korupsi.

Mata Kuliah ***Course Name***	**:**	**Jaringan Telekomunikasi** ***Telecommunication Network***
Kode Mata Kuliah ***Course Code***	**:**	**RTD214103** ***RTD214103***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 3 jam per minggu** **2 *credits* / 3 *hours per week***
Semester ***Semester***	**:**	**4 (Empat)** ***4 (Four)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Setelah mengikuti kuliah ini, mahasiswa diharapkan:
After attending this course, students are expected to:

a. Mampu memahami konsep jaringan telekomunikasi dan terminal jaringan
   Able to understand the concept of telecommunication network and network terminal
b. Memahami tentang SS7, switching dan manajemen jaringan
   Understand about SS7, switching and network management
c. Mengerti tentang routing serta fungsinya di dalam jaringan
   Understand about routing and its function in the network
d. Memahami tentang grounding di telekomunikasi
   Understanding about grounding in telecommunications
e. Memahami tentang PABX dan IPPBX
   Understanding about PABX and IPPBX

Pokok Bahasan
Main Subjects

1. Pengertian dasar jaringan telekomunikasi dan terminal jaringan
   Basic understanding of telecommunications networks and network terminals
2. SS7
   SS7
3. Switching : macam-macam Switching, Switching Analog dan Switching Digital
   Switching: various switching, analog switching and digital switching
4. QoS jaringan telekomunikasi (jitter, packet loss, MOS dan echo)
   Telecommunication network QoS (jitter, packet loss, MOS and echo)
5. Manajemen jaringan
   Network management
6. Fungsi routing dalam jaringan
   Routing function in the network
7. PABX
   PABX

8. IP PBX
   IP PBX
9. Pembumian atau Pentanahan
   Grounding

Pokok Bahasan
Subject

Haryadi, Sgit, Jaringan Telekomunikasi, ITB William Cinnema, Transmission Line,

Mischa Scahartz, Telecommunications Network and Protocols, modeling and analysis, Addison Wesley publishing company, 1994 Andrew Tanembaum, Computer Network Processing, Prentice Hall, 199

Mata Kuliah ***Course Name***	**:**	**Workshop Elektronika Telekomunikasi** ***Practicum of Telecommunication Electronics***
Kode Mata Kuliah ***Course Code***	**:**	**RTD214104** ***RTD214104***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 5 jam per minggu** ***2 credits / 5 hours per week***
Semester ***Semester***	**:**	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Setelah mengikuti mata kuliah Praktikum Elektronika Telekomunikasi, mahasiswa diharapkan dapat:
After taking the Telecommunications Electronics Practicum course, students are expected to be able to:

a. Mendefinisikan pengertian resonansi serta menghitung dan mengukur frekuensi resonansi seri dan parallel
   Define the meaning of resonance and calculate and measure series and parallel resonant frequencies
b. Mendesain dan menguji rangkaian *matching*
   Design and test matching circuits
c. Menghitung dan mengukur dari parameter penguat sinyal kecil
   Calculating and measuring from small signal amplifier parameters
d. Mendesain dan menguji rangkaian osilator frekuensi rendah dan tinggi
   Design and test low and high frequency oscillator circuit
e. Menganalisis dan mengukur semua parameter dari penguat daya dan pengali frekuensi
   Analyze and measure all parameters of power amplifier and frequency multiplier
f. Merangkaikan dan menguji rangkaian modulator dan demodulator
   Assemble and test the modulator and demodulator circuits
g. Mengukur keluaran dari rangkaian mixer
   Measuring the output of the mixer circuit
h. Menggabungkan semua rangkaian sub sistem menjadi sistem pemancar dan penerima
   Combine all sets of sub-systems into a transmitter and receiver system

Pokok Bahasan

Main Subjects
1. Penguat sinyal kecil *Small signal booster* 2. Osilator dan multivibrator *Oscillator and multivibrator* 3. Filter Aktif dan Filter Pasif (Rancang bangun Filter Butterwoth, Chebyshev dari LPF, HPF, BPF, dan BRF) *Active Filters and Passive Filters (Design Butterwoth Filters, Chebyshev from LPF, HPF, BPF, and BRF)* 4. Rangkaian matching *Matching circuit* 5. Modulator dan demodulator *Modulator and demodulator* 6. Mixer *Mixer* 7. Sistem Pemancar dan Penerima *Transmitter and Receiver System* 8. Proyek (Penguat Frek. Tinggi, Modul-2 Lab. menggunakan PCB hasil Bengkel Elektromekanik) *Project (High Frequency Amplifier, Module-2 Lab. using PCB from Electromechanical Workshop)*
Referensi ***Reference(s)***
General Secretariat ITU, Radio Regulations, Vol.1, ITU, Geneva, 1990 Jack Smit, Electronic Communication circuit, Prentice Hall, 2012 Kennedy George, Electronic Communications Systems, McGraw-Hill.Co, Singapura 1988 Roddy Dennis & Coolen, John, Electronic Communications, Prentice-Hall of India Ltd, New Delhi, 1981

Mata Kuliah ***Course Name***	:	**Workshop Pengolahan Citra** ***Workshop of Image Processing***
Kode Mata Kuliah ***Course Code***	:	**RTD214105** ***RTD214105***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**3 sks / 6 jam per minggu** ***3 credits / 6 hours per week***
Semester ***Semester***	:	**4 (Empat)** ***4 (Four)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah ***Learning Outcomes Imposed on Course***
Mahasiswa mampu memahami konsep dasar pengolahan citra digital, memahami operasi maupun metode yang diaplikasikan pada citra digital dan mampu melakukan praktikum dengan menggunakan metode-metode pengolahan pada citra digital. *Students are able to understand the basic concepts of digital image processing, understand operations and methods applied to digital images and are able to do practical work using processing methods on digital images.*

Pokok Bahasan
Main Subjects

1. Konsep dasar pengolahan citra
   The basic concept of image processing
2. Operasi aritmatik dan geometri pada citra, transformasi (Walsh, Hadamard)
   Arithmeti and Geometric Operation in Image Processing, Transformation (Walsh, Hadamard)
3. Filtering pada citra digital
   Digital Image Processing Filtering
4. Histogram
   Histogram
5. Deteksi tepi
   Edge Detection
6. Morphologi biner
   Binary Morphology
7. Kompresi dan dekompresi citra
   Image Compression and Decompression
8. Watermark
   Watermark
9. Pengenalan pola
   Pattern Recognition
10. Proyek
    Project

Referensi
Reference(s)

Aniati murni Arymurthy & Suryana Setiawan, Pengantar Pengolahan Citra, Elex Media Komputindo, 1992.

Gonzales, Rafael C., Digital Image Processing, Second Edition, Addison-wesley publishing, 1992.

Jain, Anil K., Fundamentals of Digital Image Processing, Prentice Hall international, 1989.

Rinaldi Munir, Pengolahan Citra digital dengan Pendekatan Algoritmik, Penerbit Informatika Bandung, 2004.

Willey, Digital Image Processing, 3rd edition, 2001

Mata Kuliah ***Course Name***	**:**	**Praktikum Antena** ***Practicum of Antenna***
Kode Mata Kuliah ***Course Code***	**:**	**RTD214106** ***RTD214106***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menjelaskan alat ukur parameter antena dan mampu mengoperasikannya.
   Students will be able to describe antenna parameter measurement instruments and able to operate them.
b. Mahasiswa mampu melakukan pengukuran kinerja antena kawat pada frekuensi UHF

Student will be able to measure wire antenna performance on ultra high frequency

c. Mahasiswa mampu melakukan pengukuran redaman ruang bebas.
Students will be able to measure free space loss

d. Mahasiswa mampu melakukan pengukuran pola radiasi dan polarisasi antena.
Student will be able to measure antenna pattern and polarization.

e. Mahasiswa mampu melakukan pengukuran impedansi, koefisien pantul, VSWR, *gain* dan *bandwidth* antena.
Student will be able to measure impedance, reflection coefficient, VSWR, gain and bandwidth of antenna.

f. Mahasiswa mampu merancang bangun sebuah antena dengan spesifikasi tertentu.
Student will be able to design and build an antenna for specific requirement.

Pokok Bahasan
Main Subjects

1. Alat ukur parameter antena
   Antenna measurement instruments
2. Pengukuran kinerja antena kawat pada frekuensi UHF
   Wire antenna performance measurement on Ultra High Frequency
3. Pengukuran redaman ruang bebas
   Free space loss measurement
4. Pengukuran pola radiasi dan polarisasi
   Pattern and Polarization measurement
5. Pengukuran impedansi, koefisien pantul, VSWR, *gain* dan *bandwidth*
   Impedance, reflection coefficient, VSWR, gain and bandwidth measurements.
6. Proyek (pembuatan dan pengukuran antena)
   Project (design, simulation and measurement of antenna)

Referensi
Reference(s)

Main:

1. Koesmarijanto. 2011, Modul Ajar Praktikum Antena dan Propagasi. Politeknik Negri Malang.
2. Balanis, Constantine A., *Antenna Theory : Analysis and Design*, John Wiley and Sons, 2005.
3. Milligan, Thomas A., *Modern Antenna Design*, , John Wiley and Sons, 2005.

Supplementary:

1. Ulaby, Fawwaz T., Fundamentals of Applied Electromagnetics 5th edition,Pearson, 1994
2. Hong, Y.W. Peter, Cooperative Communications and Networking : Technologies and System Design, Springer, 2010
3. www.antenna-theory.com
4. Okamoto, Garret T., Smart Antenna Systems And Wireless LANs, Kluwer Academic Publishers, 2002.
5. https://www.cst.com/academia/examples
6. http://www.changpuak.ch/electronics/

Mata Kuliah ***Course Name***	:	**Praktikum Pemrosesan Sinyal Digital** ***Practicum of Digital Signal Processing***

Kode Mata Kuliah ***Course Code***	:	**RTD214107** **RTD214107**
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	:	**4 (Empat)** ***4 (Four)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Setelah mengikuti mata kuliah Praktikum Pemrosesan Sinyal Digital, mahasiswa diharapkan dapat membuat dan menguji program MATLAB/ PYTHON tentang pemrosesan sinyal digital dan sistem meliputi pembangkitan sinyal, operasi dasar sinyal dan pengujian sinyal.
After taking the Digital Signal Processing Practicum course, students are expected to be able to create and test a MATLAB/PYTHON program on digital signal processing and systems including signal generation, signal basic operations and signal testing.

Pokok Bahasan
Main Subjects

1. Praktikum operasi dasar sinyal (pergeseran, penskalaan, pembalikan, penjumlahan, pengurangan, perkalian, pembagian)
   Practicum of Basic operation in Signal (shifting, scaling, inverse, addition, subtraction, multiply, division)
2. Praktikum sifat sistem (kausalitas, linearitas, time invariant/variant)
   Practicum of System (Causality, Linearity, Time-invariant / variant)
3. Praktikum konvolusi
   Practicum of convolution
4. Praktikum transformasi Fourier dan inverse fourier
   Practicum of Fourier Transformation and Fourier inverse
5. Praktikum transformasi Z
   Practicum of Z transformation
6. Praktikum filter digital
   Practicum of Digital filter

Referensi
Reference(s)

Hans J. W., (penerjemah), 1996, "Sinyal dan Sistem Linier", Edisi ke-3, Erlangga, Jakarta.
O'Flynn M., Moriarty, E., 1987, "Linear Systems, Time Domain and Transform Analysis",
Robert, M. J., "Signal and System" , McGraw Hill, New York.
Simon H., Barry V. V., 2004, "Signal and System", John Wiley & Son, New York.
Michael Corinthios, "Signals, Systems, Transform, and Digital Signal Processing with MATLAB", Taylor and Francis Group, LLC, 2009.
Tadeusz A. Wysocki, Bahram Honary, and Beata J. Wysocki, "Signal Processing for Telecommunications and Multimedia", Springer, London, England, 2005.
Gordon E. Carlson, "Signal and Linear System Analysis, a Matlab tutorial", Prentice Hall, 2nd Edition, Usa 2000.

Mata Kuliah ***Course Name***	:	**Praktikum IoT dan WSN** ***Practicum of IoT and WSN***

Kode Mata Kuliah ***Course Code***	**:**	**RTD214108** ***RTD214108***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Setelah mengikuti mata kuliah Praktikum Pemrosesan Sinyal :
After following the Signal Processing Practicum course:

a. Mahasiswa dapat memahami konsep IoT dan WSN
   Students will be able understand IoT and WSN concept
b. Mahasiswa dapat merancang dan mengimplementasikan perangkat IoT dan WSN
   Students will be able to design and implement IoT and WSN device

Pokok Bahasan
Main Subjects

1. Praktikum jenis-jenis sensor dan kalibrasi
   Practicum of sensors and calibration type
2. Praktikum Desain IoT & WSN
   Practicum of IoT & WSN design
3. Praktikum Protokol komunikasi IoT & WSN
   Practicum of IoT & WSN communication protocol

Referensi
Reference(s)

The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World http://www.amazon.in/Internet-Things-Smart-Cities-Changing/dp/0789754002/ref=sr_1_9?ie=UTF8&qid=1474003280&sr=8-9&keywords=internet+of+things+book

Mata Kuliah ***Course Name***	**:**	**Workshop Sistem Keamanan Jaringan** ***Workshop of Network Security System***
Kode Mata Kuliah ***Course Code***	**:**	**RTD214109** ***RTD214109***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 5 jam per minggu** ***2 credits / 5 hours per week***
Semester ***Semester***	**:**	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu mengidentifikasi celah keamanan dalam jaringan komputer.
Students are able to identify security holes in computer networks.
b. Mahasiswa mampu menjelaskan masalah keamanan komputer, menggunakan tool keamanan standar untuk menemukan dan memperbaiki celah keamanan dalam jaringan komputer.
Students are able to explain computer security problems, using standard security tools to find and fix security holes in computer networks.
c. Mahasiswa mampu memahami beberapa algoritma kriptografi dan protokol yang mendasari aplikasi kemanan jaringan, serta memahami system level security.
Students are able to understand several cryptographic algorithms and protocols that underlie network security applications, and understand system level security.

Pokok Bahasan
Main Subjects

1. Konsep keamanan komputer dan jaringan
The concept of computer and network security
2. Keamanan jaringan komputer dan pembagian level akses
Computer network security and access level
3. Manajemen password, tingkatan hak akses serta mengenal teknik pencurian hak akses dengan berbagai metode
Password management, level of access rights, and the techniques of theft of access rights with various methods
4. Program jahat dan antivirus
Malware and antivirus
5. Firewall
Firewalls
6. Konsep pengamanan yang spesifik menggunakan IDS dan IPS beserta tools dan perangkat yang digunakan
The concept of security using IDS and IPS along with the tools and the devices that used
7. Kriptografi yang digunakan untuk menjamin keamanan data
Cryptography used to ensure data security
8. VPN dan Keamanan level aplikasi
VPN and application-level security
9. Desain dan tantangan sistem generasi selanjutnya, blockchain, dan Cyber-Risk Assessment
Next Generation System Designs and Challenges, blockchain, and Cyber-Risk Assessment

Referensi
Reference(s)

Arthur Salmon, Warun Levesque, Michael McLafferty, 2017, Applied Network Security (Master the art of detecting and averting advanced network security attacks and techniques, Packt Publishing, ISBN: ISBN 978-1-78646-627-3.
Michael E. Whitman, Herbert J. Mattord, David Mackey, Andrew Green, 2017, Guide to Network Security, Course Technology Cengage Learning Publishing, ISBN-10: 0-8400-2422-3
Richard Bejtlich, 2017, The Practice of Network Security Monitoring (Understanding Incident Detection and Response), No Starch Press, ISBN-10: 1-59327-509-9

Mata Kuliah ***Course Name***	**:**	**Kewirausahaan** ***Enterpreneurship***
Kode Mata Kuliah	**:**	**RTD215001**

Course Code		***RTD215001***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 2 jam per minggu** **2** ***credits / 2 hours per week***
Semester ***Semester***	**:**	**5 (lima)** ***5 (Five)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Mahasiswa memiliki wawasan kewirausahaan yang meliputi :
Student possess knowledge on entrepreneurship which covers :

a. Karakteristik wirausaha,tipe wirausaha, menumbuhkan keinginan menjadi wirausaha
   Entrepreneurship characteristics, types of entrepreneus, growing the inclination to become an entrepreneur
b. Melakukan inisiatif, kreatif, dan berinovatif,
   Performs initiative, creative, and innovative
c. Melakukan komunikasi yang efektif,
   Performs effective communication
d. Membangun kerja kelompok yang efektif,
   Creating an effective work group
e. Mengenali cara membangun hubungan antar personal,
   Recognizing how to build social network
f. Mengidentifikasi masalah dan mencari solusi masalah secara ilmiah,
   Identifying problems and find a scientific solution
g. Mengidentifikasi strategi pelayanan pelanggan.
   Identifying customer service strategy

Pokok Bahasan
Main Subjects

1. Menjadi wirausaha
   Becoming an enterpreneur
2. Berpikir perubahan
   Think of change
3. Berpikir kreatif
   Creative thinking
4. Berorientasi pada Tindakan
   Action Oriented
5. Pengambilan Resiko
   Risk taking
6. Kepemimpinan
   Leadership
7. Etika bisnis
   Business etiquette
8. Faktor X
   Factor x
9. Mencari gagasan Usaha
   Finding business idea
10. Pemasaran
    Marketing
11. Manajemen Keuangan dan Pembiayaan Usaha
    Financial management and business financing

12. Memulai usaha baru
    Starting new business.
13. Perencanaan bisnis/bisnis game
    Business planning.

Referensi
Reference(s)

Manual Untuk Instruktur Kewirusahaan untuk program Strata 1, Rumah perubahan & Mandiri,2010
Entreupreneurship & Quality Management System Skill Development Program, Bandung, 2007.
Zimmerer dan Scarborough.2002.Pengantar Kewirausahaan dan Manajemen Bisnis Kecil,Jakarta:PT Prenhallindo.
Umar,Husein.2001.Studi Kelayakan Bisnis.Jakarta :PT Gramedia Pustaka Utama

Mata Kuliah ***Course Name***	**:**	**Keselamatan dan Kesehatan Kerja** ***Occupational Health and Safety***
Kode Mata Kuliah ***Course Code***	**:**	**RTD215102** ***RTD215102***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 3 jam per minggu** **2 *credits* / 3 *hours per week***
Semester ***Semester***	**:**	**5 (lima)** ***5 (Five)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa memiliki kompetensi dasar tentang Keselamatan dan Kesehatan Kerja dan filosofi serta manfaat pencegahan kecelakaan.
   Students have basic competencies on Occupational Health and Safety and the philosophy and benefits of accident prevention.
b. Mahasiswa mampu memahami arti keselamatan dan kecelakaan kerja yang diterapkan dalam dunia kerja khususnya bidang telekomunikasi.
   Students are able to understand the meaning of work safety and accidents that are applied in the world of work, especially in the telecommunications sector.
c. Mahasiswa mampu mengimplementasikan peraturan perundang-undangan tentang keselamatan dan kesehatan kerja di Republik Indonesia serta menjalankan UU ketenagakerjaan.
   Students are able to implement laws and regulations on occupational safety and health in the Republic of Indonesia and implement labor laws.
d. Mahasiswa mampu mengevaluasi penilaian keselamatan kerja dalam memanfaatkan program K3 secara terstruktur.
   Students are able to evaluate work safety assessments in utilizing the OHS program in a structured manner.
e. Mahasiswa memiliki motivasi tentang kebersihan dan kerapian tempat kerja serta bangunan.
   Students are motivated about the cleanliness and tidiness of the workplace and buildings.
f. Mahasiswa mampu melakukan penanganan dalam pengamanan peralatan mekanik dan elektrik.
   Students are able to handle the security of mechanical and electrical equipment.
g. Mahasiswa selalu melakukan perlindungan diri dengan menggunakan alat pelindung diri, sehingga berdampak pada kesehatan kerja.
   Students always protect themselves by using personal protective equipment, so that it has an impact on

occupational health.

h. Mahasiswa mampu melakukan perlindungan dan pencegahan bahaya kebakaran disertai oleh standar LOTO.
Students are able to protect and prevent fire hazards accompanied by LOTO standards.

i. Mahasiswa mampu mengevaluasi dan menganalisa kecelakaan kerja berdasarkan peraturan perundangan K3.
Students are able to evaluate and analyze work accidents based on OHS legislation.

Pokok Bahasan
Main Subjects

1. Kompetensi dasar tentang Keselamatan dan Kesehatan Kerja dan Filosofi serta manfaat pencegahan kecelakaan.
Basic competence on Occupational Safety and Health and Philosophy and benefits of accident prevention.
2. Arti keselamatan dan kecelakaan kerja yang diterapkan dalam dunia kerja khususnya bidang telekomunikasi.
The meaning of work safety and accidents that are applied in the world of work, especially in the telecommunications sector.
3. Implementasi peraturan perundang-undangan tentang keselamatan dan kesehatan kerja di Republik Indonesia serta menjalankan UU ketenagakerjaan.
Implementation of laws and regulations on occupational safety and health in the Republic of Indonesia as well as implementing labor laws.
4. Evaluasi penilaian keselamatan kerja dalam memanfaatkan program K3 secara terstruktur.
Evaluation of occupational safety assessment in utilizing the OHS program in a structured manner.
5. Memberikan motivasi kebersihan dan kerapian tempat kerja serta bangunan.
Provide motivation for cleanliness and tidiness of the workplace and buildings.
6. Penanganan dalam pengamanan peralatan mekanik dan elektrik.
Handling in securing mechanical and electrical equipment.
7. Perlindungan diri dan alat pelindung diri.
Personal protection and personal protective equipment.
8. Perlindungan dan pencegahan bahaya kebakaran disertai oleh standar LOTO.
Protection and prevention of fire hazards are accompanied by LOTO standards.
9. Evaluasi dan analisa kecelakaan kerja berdasarkan peraturan perundangan K3.
Evaluation and analysis of work accidents based on OHS legislation.

Referensi
Reference(s)

Undang-undang tentang Ketenagakerjaan. 2003.
Undang-undang tentang Penyelesaian Perselisihan Hubungan Industrial. 2004.
Dessler, Gary. 2007. Manajemen Personalia. Jakarta: Erlangga.
Bennet Silalahi. 1995. Manajemen Keselamatan dan Kesehatan Kerja. Jakarta: Bina Rupa Aksara
Tulus Agus. 1989. Manajemen Sumber Daya Manusia. Jakarta: PT. Gramedia Pustaka
Schuler, Randall S. dan Susan E. Jackson. 1999. Manajemen Sumber Daya Manusia: Menghadapi Abad Ke-21. Jakarta: Erlangga.

Mata Kuliah ***Course Name***	**:**	**Praktikum Jaringan Telekomunikasi** ***Practicum of Telecommunication Network***
Kode Mata Kuliah ***Course Code***	**:**	**RTD215103** ***RTD215103***

Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** **2 *credits* / 4 *hours per week***
Semester ***Semester***	**:**	**5 (Lima)** ***5 (Five)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa dapat melakukan pemasangan kabel dan grounding
Students can do wiring and grounding
b. Mahasiswa dapat melakukan pengukuran perangkat telepon analog maupun digital yang mengacu pada standar SNI
Students can measure analog and digital telephone equipment that refers to the SNI standard
c. Mahasiswa mengetahui karakteristik kabel transmisi dan pengukurannya
Students know the characteristics of transmission cables and their measurements
d. Mahasiswa dapat memprogram dan mengkonfigurasi perangkat PABX, IPPBX, softphone dan IP Phone
Students can program and configure PABX, IPPBX, softphone and IP Phone devices
e. Mahasiswa dapat melakukan pengukuran kualitas komunikasi yang meliputi delay, jitter, loss dan lainnya
Students can measure communication quality which includes delay, jitter, loss and others
f. Mahasiswa dapat menginterkoneksikan PABX konvensional dan IP PBX
Students can interconnect conventional PABX and IP PBX

Pokok Bahasan
Main Subjects

1. Keterampilan perkabelan
Wiring skills
2. Pengujian telepon standar mengacu SNI
Standard telephone testing refers to SNI
3. Karakteristik kabel transmisi
Characteristics of transmission cable
4. Pemrograman PABX
PABX Programming
5. Pengoperasian fitur PABX
PABX feature operation
6. IP phone dan IPPBX
IP phone and IPPBX
7. Pengukuran kualitas komunikasi (delay, jitter, loss, dll)
Measurement of communication quality (delay, jitter, loss, etc.)
8. Interkoneksi PABX konvensional dan IPPBX
Interconnection of conventional PABX and IPPBX

Referensi
Reference(s)

Buku SNI 04-7042-2004 tentang Pesawat Telepon Analog Diktat Petunjuk Praktikum Jaringan Telekomunikasi I, Program Studi JTD, 2012, Polinema Instalasi Manual PABX KX-T123210 Instalasi Manual PABX KX-T206 Instalasi Manual PABX KX-TD100
Martono, 2013, Buku Petunjuk Praktikum Jaringan Telekomunikasi 2, Polinema Instalasi manual IP Phone KE 1020 SIP Version: 4.32.08 Instalasi manual Softphone H323 PC-Telephone

Mata Kuliah ***Course Name***	:	**Workshop Kecerdasan Buatan** ***Workshop of Artificial Intelligence***
Kode Mata Kuliah ***Course Code***	:	**RTD215104** ***RTD215104***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**3 sks / 6 jam per minggu** ***3 credits / 6 hours per week***
Semester ***Semester***	:	**5 (Lima)** ***5 (Five)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Mahasiswa mampu memahami tentang konsep kecerdasan buatan, merepresentasikan masalah dan pengetahuan sebagai pencarian sebuah solusi, serta dapat menerapkan metode sistem pakar, logika fuzzy, algoritma genetika, jaringan syaraf tiruan dan deep learning sebagai solusi dari suatu permasalahan.
Students are able to understand the concept of artificial intelligence, represent problems and knowledge as a search for a solution, and can apply expert system methods, fuzzy logic, genetic algorithms, artificial neural networks and deep learning as solutions to a problem.

Pokok Bahasan
Main Subjects

1. Konsep Kecerdasan Buatan
   The concept of Artificial Intelligence
2. Representasi Ruang Keadaan
   State Space Representation
3. Representasi Pengetahuan (logika, tree, jaringan semantik, frame, dll)
   Knowledge Representation (Logic, Tree, Semantic Network, Frame, etc)
4. Searching: Pencarian buta (DFS, BFS), Pencarian Heuristik (Generate And Test, Simple Hill Climbing, Steepest Ascent Hill Climbing dll)
   Searching: Blind Searching (DFS, BFS), Heuristic Searching(Generate and Test, Simple Hill Climbing, Steepest Ascent Hill Climbing etc)
5. Sistem Pakar (Basis pengetahuan, Metode Inferensi)
   Expert System (Knowledge Base, Inference Method)
6. Fuzzy (Logika Fuzzy, Fuzzifikasi, Metode Inferensi, Defuzzifikasi, Fuzzy Clustering)
   Fuzzy (Fuzzy Logic, Fuzzification, Inference Method, Defuzzification, Fuzzy Clustering)
7. Algoritma Genetika
   Genetic Algorithm
8. Jaringan Syaraf Tiruan (Backpropagation, Perceptron)
   Artificial Neural Network
9. Deep Learning
   Deep Learning

Referensi
Reference(s)

Russell, Stuart; dan Norvig, Peter. 2003. Artificial Intelligence A Modern Approach. International Edition, Edisi 2. New Jersey: Pearson Prentice-Hall Education International.
Turban, Efraim; Aronson, Jay, E.; Liang, Ting-Peng. 2005. Decision Support Systems and Intelligent Systems. International Edition, Edisi 7, New Jersey: Pearson Prentice-Hall Education International.
Jong, J.S. (2009), Jaringan Syaraf Tiruan dan Pemrogramannya Menggunakan Matlab, 2nd edition, C.V. Andi, Yogyakarta.
Giarratano, J and G. Riley, 2004. Expert System: Principle and Programming, 4th ed, PWS Kent, USA.
Kusumadewi, Sri. 2003. Artificial Intelligence (teknik dan aplikasinya), Penerbit Graha Ilmu, Yogyakarta
Kusumadewi, Sri. 2004. Membangun Jaringan Syaraf Tiruan dengan Matlab dan Excel. Penerbit Graha Ilmu, Yogyakarta

Nama Mata Kuliah ***Course Name***	:	**Komunikasi Video & Televisi Siaran** ***Video Communication & Broadcast Television***
Kode Mata Kuliah ***Course Code***	:	**RTD215105** ***RTD215105***
Jumlah sks/Jam per minggu ***Number of credits/hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits/ 3 hours per week***
Semester ***Semester***	:	**5 (Lima)** ***5 (five)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menerapkan pengetahuan terkait dengan Sistem komunikasi video dan Televisi siaran digital melalui satelit, kabel, terrestrial dan IPTV
Capable to apply knowledge of video communication systems and broadcast digital television via satellite, cable, terrestrial and IPTV
b. Mampu menganalisa pemakaian perangkat Sistem komunikasi video dan Televisi siaran digital melalui satelit, kabel, terrestrial dan IPTV
Capable to analyze the use of video communication system equipment and broadcast digital television via satellite, cable, terrestrial and IPTV
c. Mampu menganalisa dan mengimplementasikan Sistem komunikasi video dan Televisi siaran digital melalui satelit, kabel, terrestrial dan IPTV yang memenuhi kriteria implementasi yang ditetapkan dengan mempertimbangkan standar teknis, aspek kinerja, keandalan, kemudahan penerapan.
Capable to analyze and implementing video communication systems and broadcast digital television via satellite, cable, terrestrial and IPTV in accordance with the design criteria by considering technical standards, aspects of performance, reliability, ease of implementation.

Pokok Bahasan
Main Course

1. Sinyal video analog meliputi proses scanning, sinyal video komposit, pewarnaan pada televisi, sistem TV analog, sinyal baseband
Analog video signal including; scanning process, composite video signal, coloring on television signal, analog TV system, baseband signal
2. MPEG data stream dan Sinyal Video Digital sesuai ITU-BT.R.601
MPEG data stream and Digital Video Signal based on ITU-BT.R.601
3. Format Sinyal Video HDTV dan UHDTV, meliputi; format gambar, format HDTV tanpa kompresi dan antarmuka sinyal video fisik hingga UHDTV
HDTV and UHDTV Video Signal Formats, including; image formats, uncompressed HDTV formats and physical video signal interfaces up to UHDTV
4. Video dan Audio Coding , meliputi; Kompresi Video, Video Coding tingkat lanjut MPEG-4, Video coding dengan Efisiensi tinggi HEVC & UHDTV, dan Audio Coding
Video and Audio Coding, including; Video Compression, Advanced MPEG-4 Video Coding, HEVC & UHDTV

High Efficiency Video coding, and Audio Coding

5. Transmisi Sinyal televisi digital melalui satelit, meliputi; Parameter DVBS, Modulator DVBS, Pemrosesan sinyal pada satelit, Penerima DVBS, dan Sistem DVBS2 dan DVBSx.
   Transmission of digital television signals via satellite, including; DVBS Parameters, DVBS Modulator, Signal processing on satellite, DVBS Receiver, and DVBS2 and DVBSx Systems.
6. Transmisi Sinyal Televisi Digital melalui kabel broadband, meliputi; Standar DVBC, Modulator DVBC, dan Penerima DVBC
   Transmission of Digital Television Signal via broadband cable, including; DVBC Standard, DVBC Modulator and DVBC Receiver
7. Transmisi Sinyal Televisi Digital Terrestria, meliputi; Standar DVBT, Parameter Sistem DVBT, Modulator dan Transmitter DVBT, Penerima DVBT, dan Sistem DVBT2
   Transmission of Terrestria Digital Television Signal, including; DVBT Standard, DVBT Parameters, DVBT Modulator and Transmitter, DVBT Receiver and DVBT2 System
8. IPTV, meliputi; DVB-IP, IP Interface pengganti TS-ASI, dan Over the TOP TV
   IPTV, including; DVB-IP, IP Interface replacement for TS-ASI, and Over the TOP TV

Referensi
Reference(s)

Walter Fischer, 2010, "Digital Video and Audio Broadcasting Technology", 4th edition, Newyork.
John Arnold, 2007, "Digital Television Technology and Standards", Australia.
Ulrich Reimers, 2005, "DVB The Family of International Standards for Digital Video Broadcasting", 2nd Edition, Newyork
Wes Simpson & Howard Greenfield, 2007, IPTV and Internet Video: New Markets in Television Broadcasting, USA

Mata Kuliah ***Course Name***	:	**Workshop Pemrograman Aplikasi Mobile** ***Workshop of Mobile Application Programming***
Kode Mata Kuliah ***Course Code***	:	**RTD215106** ***RTD215106***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**3 sks / 6 jam per minggu** **3 *credits* / 6 *hours per week***
Semester ***Semester***	:	**5 (Lima)** **5 (*Five*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa akan dapat mengenali fitur khusus perangkat seluler sebagai platform pengembangan perangkat lunak, dan dampaknya terhadap pengembangan aplikasi.
   Students will be able to recognize the specific features of mobile devices as a software development platform, and their impact on application development,
b. Menjelaskan konsep komputasi seluler.
   Explain the concept of mobile computing.
c. Membuat aplikasi seluler untuk Android.
   Create a mobile application for Android.

Pokok Bahasan
Main Subjects

1. Perangkat Mobile: karakteristik utama dan dampak pada pengembangan software.
   Mobile Devices: main characteristics and impact on software development.
2. Prinsip Komputasi bergerak , Konsep Dasar Teknologi Mobile Internet, Arsitektur dan Struktur Android dan IoS.
   Principles of Mobile Computing, Basic Concepts of Mobile Internet Technology, Architecture and Structure of Android and IoS.
3. Android Programming dan Cross Platform Programming,

Android Programming and Cross Platform Programming,

4. Android Studio
   Android Studio
5. Threads dan Intent
   Threads and Intents
6. Penyimpanan media
   Media storage
7. Grafis 2D dan Pemrosesan Image/Citra.
   2D Graphics and Image Processing.
8. Data Base Sederhana dengan SQLite dan JSON.
   Simple Database with SQLite and JSON.
9. Lokasi dan Pemetaan
   Location and Mapping
10. Proyek: Desain dan implementasi aplikasi mobile untuk Android dan IoS.
    Project: Design and implementation of mobile applications for Android and IoS.

Referensi
Reference(s)

Dawn Griffiths and David Griffiths, Head First Android Development: A Brain-Friendly Guide, 2nd edition, 2017.

Paul Deitel, et al., Android 6 for Programmers: An App-Driven Approach, 3rd edition, Prentice Hall, 2015.

Bill Philips, et al., Android Programming: The Big Nerd Ranch Guide, 3rd edition, Big Nerd Ranch Guides, 2017.

Trish Cornez and Richard Cornez, Android Programming Concepts, Johns & Bartlett Learning, 2015.

Allan Vermeulen, et al., The Elements of Java Style, Cambridge University Press, 2000.

Gilad Bracha, The Dart Programming Language, Addison-Wesley Professional, 2015.

Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development, Wrox, 2019.

Fu Cheng, Flutter Recipes: Mobile Development Solutions for iOS and Android, Apress, 2019.

Mata Kuliah ***Course Name***	:	**Sistem Komunikasi Seluler** ***Cellular Communication System***
Kode Mata Kuliah ***Course Code***	:	**RTD215107** ***RTD215107***
Jumlah sks/Jam per minggu ***Number of Credits/Hour per Week***	:	**2 sks / 3 jam per minggu** ***2 credits/ 3 hours per week***
Semester ***Semester***	:	**5 (Lima)** **5 (*Five*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa dapat memahami klasifikasi wireless
   Students are able to understand the classification of wireless
b. Mahasiswa dapat menggambarkan dan menjelaskan dasar dan arsitektur Sistem Komunikasi Bergerak
   Students are able describe and explain the basics and architecture of Mobile Communication Systems
c. Mahasiswa dapat menjelaskan rugi-rugi yang terjadi pada gelombang radio dan dapat menghitung daya terima jangkauan sel dengan prediksi rugi-rugi dan daya referensi (sensitivitas penerima)
   Students are able explain the losses that occur in radio waves and can calculate the receiving power of the cell range with loss prediction and reference power (receiver sensitivity)
d. Mahasiswa dapat menggambarkan dan menjelaskan pembelahan sel (cell splitting)
   Students are able describe and explain cell division
e. Mahasiswa dapat menggambarkan dan menjelaskan konsep pengulangan frekuensi

Students are able describe and explain the concept of frequency repetition

Pokok Bahasan
Main Subject

1. Perkembangan sistem komunikasi bergerak 5G
   Development of 5G mobile communication systems
2. Karakteristik perambatan gelombang radio
   Characteristics of radio wave propagation
3. Pemecahan sel
   Cell division
4. Pengulangan frekuensi
   Repeat frequency
5. Hand off
   Hand off
6. Modulasi pada sistem komunikasi bergerak
   Modulation of mobile communication systems
7. Penentuan kapasitas dan optimasi jaringan seluler
   Capacity determination and mobile network optimization

Referensi
Reference(s)

Lee, William, C.Y. 1995. Mobile Cellular Telecommunication Analog and Digital System. Second Edition

Freeman, Roger, L. 1989. Reference Manual for Telecommunications Engineering. Toronto: John Willey & Sons.

Boucher, Neil, J. 1990. Cellular Radio Hand Book. California: Quantum Publishing.

Mata Kuliah ***Course Name***	**:**	**Sistem Komunikasi Fiber Optik** ***Fiber Optic Communication System***
Kode Mata Kuliah ***Course Code***	**:**	**RTD215108** ***RTD215108***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	**:**	**5 (Lima)** **5 (*Five*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menguasai sistem komunikasi fiber optik
   Students are able to master fiber optic communication system
b. Mahasiswa mampu menganalisa unjuk kerja dari sistem jaringan fiber optik dengan benar dan dapat dipertanggungjawabkan.
   Students are able to analyze the performance of the fiber optic network system correctly and reliably

Pokok Bahasan
Main Subjects

1. Teori cahaya
   Theory of light
2. Karakteristik sistem fiber optik (redaman, Dispersi, Power budget, rise time budget)
   Characteristics of fiber optic system (attenuation, dispersion, power budget, rise time budget)
3. Transmitter (Konsep dasar, LED, Laser, Desain)
   Transmitter (Basic concept, LED, Laser, Design)
4. Receiver (konsep dasar, photodetector, noise, sensitivity, desain)
   Receiver (basic concept, photodetector, noise, sensitivity, design
5. Management dispersi (Fiber bragg grating, conjunction, long-haul, high capacity)
   Management of dispersion (Fiber bragg grating, conjunction, long-haul, high capacity)
6. Multi kanal (WDM, komponen WDM, TDM, Multiplexing)
   Multi channel (WDM, component WDM, TDM, Multiplexing)
7. Atenuasi dan power budget
   Attenuation and power budget

Referensi
Reference(s)

Lotfollah Beygi, Coded Modulation Techniques in Fiber Optic Communication, Sweden, 2010 Lewis, Robichaud, Optical Fiber Communication Manual, New Brunswick, 2003
Hill, Jonathan, Fiber Optic Communications Educational Toolkit, ASEE National Conference, 2008.
Willey, John, Fiber Optic Communication System, New York, 2002.

Nama Mata Kuliah ***Course Name***	:	**Sistem Komunikasi Radio** ***Radio Communication System***
Kode Mata Kuliah ***Course Code***	:	**RTD215109** ***RTD215109***
Jumlah sks/Jam per minggu ***Number of credits/hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**5 (Lima)** ***5 (Five)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menerapkan pengetahuan di bidang Sistem telekomunikasi radio terestrial line of sight termasuk diversity, dan troposcatter
   Capable to apply knowledge of line-of-sight terrestrial radio telecommunication system including diversity, and troposcatter
b. Mampu menganalisa pemakaian perangkat sistem telekomunikasi radio terestrial line of sight termasuk diversity, dan troposcatter
   Capable to analyze the use of line-of-sight terrestrial radio telecommunications system equipment including diversity, and troposcatter
c. Mampu merancang dan mengimplementasikan sistem telekomunikasi radio terestrial line of sight termasuk pemakaian metode diversity dan troposcatter yang memenuhi kriteria desain yang ditetapkan dengan mempertimbangkan standar teknis, aspek kinerja, keandalan, kemudahan penerapan.
   Capable to design and implement a line of sight terrestrial radio telecommunications system including the use of diversity and troposcatter methods in accordance with the design criteria by considering technical standards, aspects of performance, reliability, ease of application.

Pokok Bahasan
Main Course

1. Konsep Sistem Komunikasi Radio gelombang mikro yang berkaitan dengan parameter sistem, Rambatan GEM di Udara bebas, Redaman dan Fading
   Concepts of Microwave Radio Communication System related to system parameters, wave Propagation in Free Air, Attenuation and Fading
2. Dasar sistem Komunikasi radio gelombang mikro line of sight, meliputi; Profil Lintasan, Jari-jari Fresnel, Redaman Free space Loss, dan Link budget
   Basic line of sight microwave radio communication system, including; Trajectory Profile, Fresnel Radius, Attenuation Free space Loss, and Link budget
3. Menghitung dan menganalisa redaman yang disebabkan oleh Difraksi knife edge dengan menggunakan metoda; Metode Epstain Peterson, Metode Deygout, Metode Giovaneli, Metode Japanese
   Calculate and analyze the attenuation caused by knife edge diffraction using; Epstain Peterson Method, Deygout Method, Giovaneli Method, Japanese Method
4. Menghitung dan menganalisa estimasi nilai redaman hujan yang terjadi pada lintasan komunikasi radio Line of sight
   Calculate and analyze the estimated values of rain attenuation that occurs on the Line of sight radio communication path
5. Merancang dan menerapkan metode Diversity (frekuensi, polarisasi dan space) pada sistem Komunikasi radio gelombang mikro line of sight
   Design and apply the Diversity method (frequency, polarization and space) to the line of sight microwave radio communication system
6. Merancang dan mengimplementasikan Sistem Komunikasi Trophoscatter, yang berkaitan dengan; Konsep Trophoscatter, Link Budget, Coupling Loss, Sudut Arah Antena
   Design and implement a Trophoscatter Communication System, which relates to; Trophoscatter Concept, Link Budget, Coupling Loss, Antenna Direction Angle

Referensi
Reference(s)

Hudiono, 2017, "Buku Ajar Sistem Komunikasi Radio dan Laboratorium", Politeknik Negeri Malang.
Roger L. Freeman, 2007, "Radio System Design For Telecommunications", Third Edition, The Institute of Electrical and Electronic Engineer, Inc, New York
Theodore_S._Rappaport, 2007, Introduction to wireless communication system, USA

Mata Kuliah ***Course Name***	:	**Bahasa Indonesia** ***Indonesian Language***
Kode Mata Kuliah ***Course Code***	:	**RTD216001** ***RTD216001***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 2 jam per minggu** ***2 credits / 2 hours per week***
Semester ***Semester***	:	**6 (Enam)** **6 (*Six*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

1. Menguasai aspek kosakata, kalimat, paragraf, wacana untuk menunjang kecakapan berkomunikasi lisan dalam bahasa Indonesia pada situasi formal dan ilmiah.
   Mastering aspects of vocabulary, sentence, paragraph, essay to support eloquent spoken communication in Indonesian in formal and scientific situation.
2. Menguasai aspek kosakata, kalimat, paragraf, wacana untuk menunjang kemampuan berkomunikasi tulis dengan bahasa Indonesia pada situasi formal dan ilmiah.

Mastering aspects of vocabulary, sentence, paragraph, essay to support eloquent written communication in Indonesian in formal and scientific situation.

Pokok Bahasan
Main Course

1. Diksi/ kata/peristilahan (pengertian, fungsi, strategi diksi)
   Diction / Thesaurus (definition, function, and diction strategy)
2. Kalimat (pengertian, unsur pembentuk, ciri, jenis).
   Sentence (definition, elements, characteristic, type)
3. Kalimat Efektif (pengertian, syarat)
   Effective sentence (Definition, requirements)
4. Paragraf (pengertian, unsur, cara mendukung gagasan, jenis)
   Paragraph (Definitions, elements, how to support ideas, types)
5. Esei (pengertian, unsur, cara pengembangan, dan jenis/ragarm)
   Essay (Definitions, elements, developing, and varieties)
6. Penyusunan proposal dan skripsi sebagai genre dari karya ilmiah (pengertian, unsur/bagian, metode, cara pengutipan, cara penyusunan daftar rujukan, dan aspek tata tulis skripsi)
   Composing proposal and thesis as a genre of scientific work (definition, elements/parts, methods, how to quote, how to make reference and aspects of thesis writing)
7. Penyusunan artikel ilmiah untuk publikasi dalam jurnal.
   Composing scientific article for journal publication.

Referensi
Reference(s)

Mujianto, 2017. Bahasa Indonesia (Pengantar Kemampuan Menulis). Polinema Press.
Akhadiah, Sabarti. 1998. Pembinaan Kemampuan Menulis Bahasa Indonesia. Jakarta:Erlangga.
Hasan, Awi. 2003. Tata Bahasa Baku Bahasa Indonesia. Jakarta: Balai Pustaka.
Pendidikan Nasional. 2008. Kamus Besar Bahasa Indonesia. Edisi ke-8. Jakarta: PT Gramedia Pustaka Utama.
Sakri, Ajat, 1992, Kalimat Efektif. Bandung: Pn. Ganesha.
Suparno dan Yunus, Mohammad. 2002. Ketrmpilan Dasar Menulis. Jakarta: Universitas Terbuka.
Wahab, Abdul, 1995. Ketrampilan Membaca dan Menuli. Malang: IKIP Malang.

Mata Kuliah ***Course Name***	**:**	**Desain Proyek** ***Project Design***
Kode Mata Kuliah ***Course Code***	**:**	**RTD216102** ***RTD216102***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**6 (Enam)** **6 (*Six*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menjelaskan pentingnya manajemen proyek
   Students will be able to explain the importance role of project managements
b. Mahasiswa mampu menjelaskan organisasi proyek.
   Students will be able to explain project organization
c. Mahasiswa mampu menjelaskan metode seleksi, perencanaan dan penjadwalan proyek.
   Students will be able to explain project selection, planning and scheduling methods

d. Mahasiswa mampu menjelaskan metode pengalokasian sumber daya.
Students will be able to explain resource management method
e. Mahasiswa mampu menjelaskan pentingnya kepemimpinan dan manajemen resiko
Students will be able to explain the importance of leadership and risk management
f. Mahasiswa mampu menjelaskan metode optimasi proyek, pengendalian proyek dan aspek lain dalam manajemen proyek
Students will be able to explain project optimization, control and other aspect of project managements
g. Mahasiswa mampu menerapkan best pratice manajemen proyek pada proyek sungguhan
Students will be able to implement the project management best practice in real project.

Pokok Bahasan
Main Subjects

1. Pengantar manajemen proyek
Introduction to project management
2. Organisasi proyek (struktur, budaya, dan stakeholder management)
Project organization
3. Seleksi, perencanaan dan penjadwalan proyek
Project selection, planning and scheduling
4. Pengalokasian sumber daya
Resources management
5. Kepemimpinan dan Manajemen resiko
Leadership and risk management
6. Optimasi proyek
Project optimization
7. Pengendalian proyek dan aspek-aspek lain dalam manajemen proyek.
Controlling the project and other aspects in project management

Referensi
Reference(s)

Charvat, Jason, *Project Management Methodologies: Selecting, Implementing, and Supporting Methodologies and Processes for Projects*, John Wiley & Sons, Inc., 2003.

J. Kent Crawford et al, *Project Management Roles & Responsibilities*, Center for Business Practices, 2004.

Winston, Wayne L., Albright S. Christian, *Practical Management Science*, South-Western Cengage Learning, 2007.

Mata Kuliah ***Course Name***	:	**Pra skripsi** ***Pra Final Project***
Kode Mata Kuliah ***Course Code***	:	**RTD216103** ***RTD216103***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	:	**6 (Enam)** **6 (Six)**
Capaian Pembelajaran yang Dibebankan pada Mata Kuliah ***Learning Outcomes Imposed on Course***		

a. Mengidentifikasi konsep, dasar-dasar, prinsip, tujuan, kegunaan, dan langkah-langkah penelitian.
Identify concepts, basics, principles, objectives, uses, and research steps.
b. Menetapkan masalah yang akan dikaji dalam penelitian.
Determine the problem to be studied in the research.
c. Memilih metodologi penelitian yang tepat untuk mengkaji masalah yang telah ditetapkan.
Choosing the right research methodology to study the problem that has been set.
d. Melakukan pengumpulan data dengan prosedur dan teknik yang tepat.
Perform data collection with appropriate procedures and techniques.
e. Melakukan analisis data sesuai dengan teknik analisis data yang tepat.
Perform data analysis in accordance with appropriate data analysis techniques.
f. Membuat kesimpulan yang benar sesuai dengan hasil temuan penelitian.
Make the correct conclusion in accordance with the research findings.
g. Menyusun laporan penelitian yang dituangkan dalam bentuk proposal skripsi.
Prepare a research report that is outlined in the form of a thesis proposal.

Pokok Bahasan
Main Subjects

1. Konsep dasar penelitian, dasar-dasar, prinsip, tujuan, kegunaan, dan langkah-langkah penelitian
Research basic concepts, principles, principles, objectives, uses, and research steps
2. Menetapkan masalah yang akan dikaji dalam penelitian
Define the problem to be studied in the research
3. Pendekatan/rancangan dan metodologi penelitian
Research approach/design and methodology
4. Prosedur pengumpulan data (instrumen dan teknik pengumpulan data)
Data collection procedures (data collection instruments and techniques)
5. Pengolahan/analisis data (prosedur dan teknik analisis data)
Data processing/analysis (data analysis procedures and techniques)
6. Prosedur pembahasan dan penyimpulan
Discussion and conclusion procedure
7. Notasi ilmiah (teknik sitasi, penyusunan daftar pustaka, dan aspek tata tulis)
Scientific notation (citation techniques, bibliography compilation, and aspects of writing)

Referensi
Reference(s)

Bogdan, R.C. and Biklen, S.K. 1992. Qualitative Research for Education: An Introduction to Theory and Methods. Boston: Allyn and Bacon.
Hermawan, Asep, M.Sc. 2006. Penelitian Bisnis Paradigma Kuantitatif, Grasindo, Jakarta.
Santoso, Singgih. 2002. SPSS Versi 10 Mengolah Data Statistik Secara Profesional, Gramedia, Jakarta.
Sukmadinata, Nana Sy. 2005. Metode Penelitian Pendidikan. Bandung: PT Remaja Roosdakarya.

Mata Kuliah ***Course Name***	:	**Metodologi Penelitian** ***Research Method***
Kode Mata Kuliah ***Course Code***	:	**RTD216104** ***RTD216104***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**1 sks / 2 jam per minggu** ***1 credits / 2 hours per week***

Semester ***Semester***	**:**	**6 (Enam)** **6 (*Six*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Mahasiswa memiliki kompetensi dalam menerapkan metode penelitian yang mencakup kompetensi dalam:
Students have competence in applying research methods which include competence in:

a. mengidentifikasi konsep, dasar-dasar, prinsip, tujuan, kegunaan, macam-macam metode dan langkah- langkah penelitian
identify concepts, basics, principles, objectives, uses, various methods and research steps
b. menetapkan masalah yang akan dikaji dalam penelitian
determine the problem to be studied in the research
c. memilih metodologi penelitian yang tepat untuk mengkaji masalah yang telah ditetapkan.
choose the right research methodology to examine the problem that has been set.
d. melakukan pengumpulan data dengan prosedur dan teknik yang tepat.
carry out data collection with appropriate procedures and techniques.
e. melakukan analisis data sesuai dengan teknik analisis data yang tepat,
perform data analysis in accordance with appropriate data analysis techniques,
f. membuat simpulan yang benar sesui dengan hasil temuan penelitian,
make correct conclusions in accordance with the research findings,
g. menyusun laporan penelitian yang dituangkan dalam bentuk skripsi dan artikel ilmiah untuk jurnal yang sesuai dengan kaidah penulisan ilmiah.
prepare research reports in the form of thesis and scientific articles for journals in accordance with scientific writing rules.

Pokok Bahasan
Main Subjects

1. Konsep dasar penelitian (pengertian, dasar-dasar, prinsip, tujuan, kegunaan, dan Langkah-langkah penelitian
The basic concepts of research (definition, basics, principles, objectives, uses, and research steps
2. Karakteristik, langkah-langkah dan jenis-jenis penelitian.
Characteristics, steps and types of research.
3. Pendekatan/ancangan dan metodologi penelitian
Research approach/design and methodology
4. Prosedur pengumpulan data (instrumen dan teknik pengumpulan data)
Data collection procedures (data collection instruments and techniques)
5. Pengolahan/analisis data (prosedur dan teknik analisis data)
Data processing/analysis (data analysis procedures and techniques)
6. Prosedur pembahasan dan penyimpulan
Procedure for discussion and conclusion
7. Notasi ilmiah (teknik sitasi, penyusunan daftar pustaka, dan aspek tata tulis)
Scientific notation (citation techniques, preparation of bibliography, and aspects of writing)

Referensi
Reference(s)

Bogdan, R.C. and Biklen, S.K. 1992. Qualitative Research for Education: An Introduction to Theory and Methods. Boston: Allyn and Bacon.
Hermawan, Asep, M.Sc. 2006. Penelitian Bisnis Paradigma Kuantitatif, Grasindo, Jakarta.
Santoso, Singgih. 2002. SPSS Versi 10 Mengolah Data Statistik Secara Profesional, Gramedia, Jakarta.
Sukmadinata, Nana Sy. 2005. Metode Penelitian Pendidikan. Bandung: PT Remaja Roosdakarya.

Mata Kuliah	**:**	**Praktikum Sistem Komunikasi Seluler**

Course Name		*Practicum of Cellular Communication System*
Kode Mata Kuliah *Course Code*	:	**RTD216105** *RTD216105*
Jumlah sks/ Jam per minggu *Number of credits/ Hours per week*	:	**2 sks / 4 jam per minggu** *2 credits / 4 hours per week*
Semester *Semester*	:	**4 (Empat)** **4 (*Four*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa memiliki kompetensi dapat merencanakan sel dengan konsep dasar tentang kanal GSM dan DCS, traffic, interferensi
Students have the competence to plan cells with basic concepts about GSM and DCS channels, traffic, interference,
b. Mampu mengaplikasikan software Atoll dalam cell planing, mendesain link budget, konsep kanal dan link capacity sistem CDMA, mengoperasikan alat GSM jammer dan GSM trainer, dan melakukan cloning SIMCard dengan analisis struktur SIMCard, jenis nomor identitas dalam sistem GSM dan DCS, prosedur authentication, Ki, algoritma A3, A5 dan A8.
Able to apply Atoll software in cell planning, design link budget, channel concept and link capacity of CDMA system, operate GSM jammer and GSM trainer, and perform SIMCard cloning by analyzing SIMCard structure, types of identity numbers in GSM and DCS systems, authentication procedures, Ki, algorithms A3, A5 and A8.
c. Mengaplikasikan software MapInfo untuk plot koordinat BTS, dapat mendesain aplikasi teknologi terbaru pada sistem seluler dan dapat membuat bisnis plan dalam bidang telekomunikasi.
Apply Map Info software to plot BTS coordinates, can design the latest technology applications on cellular systems and can make business plans in the telecommunications sector.

Pokok Bahasan
Main Subjects

1. Konsep Kanal sistem GSM dan DCS *GSM and DCS System Channel Concept*
2. Perencanaan Kapasitas User Setiap BTS/RBS Maksimum dan Perencanaan Sel
Maximum User Capacity Planning for Each BTS/RBS and Cell Planning
3. Aplikasi Software Atoll,
Atoll Software
4. Proses Autentikasi dan Keamanan Jaringan GSM Melalui Cloning SIMCard
GSM Network Authentication and Security Process Through Cloning SIMCard
5. Pemahaman Fitur GSM Menggunakan GSM Trainer
Understanding GSM Features Using GSM Trainer
6. Konsep Kanal CDMA, Link Budget Sistem CDMA, Link Capacity Sistem CDMA
CDMA Channel Concept, CDMA System Link Budget, CDMA System Link Capacity
7. Aplikasi MAP Info untuk Plot koordinat BTS
MAP Info application for BTS coordinates Plot
8. Analisis Sinyal GSM Menggunakan Alat GSM Trainer
GSM Signal Analysis Using GSM Trainer Tool
9. Pemahaman Konsep Kerja Alat GSM Jammer
Understanding the Working Concept of GSM Jammer Tool
10. Desain Penerapan Teknologi Terbaru pada Sistem Seluler dan bisnis plan dalam bidang telekomunikasi

Design of the latest technology application in cellular systems and business plans in the telecommunications sector

Referensi
Reference(s)

1. Praktikum Sistem Komunikasi Bergerak. Politeknik Negeri Malang. 2012.
Anonim, 1998. GSM System Survey, Ericsson Radio System AB.
2. Kim, Kyoung Il. 2000. HandBook Of CDMA System Design, Engineering, and Optimation. USA: Printice Hall.
3. Siemens Simulation (CBT).
4. Buku Pegangan Siswa. Sistem Komunikasi Radio Bergerak Cellular. Telkom. Divisi Pelatihan. PT. Telekomunikasi Indonesia.
5. Panduan GSM Trainer.
6. Panduan GSM Trainer Analyzing.
7. Praktikum Sistem Komunikasi Bergerak. Politeknik Negeri Malang. 2012.
8. MAP Info.
9. Garg, V. K, 2002. IS-95 CDMA and CDMA2000-Cellular/PCS Systems Implementation, Publishing House of Electronics Industry: Beijing.
10. Tutorial Nokia Siemens Network (NSN)..

Nama Mata Kuliah ***Course Name***	:	**Praktikum Komunikasi Video & Televisi Siaran** ***Practicum of Video Communication & Broadcast Television***
Kode Mata Kuliah ***Course Code***	:	**RTD216106** ***RTD216106***
Jumlah sks/Jam per minggu ***Number of credits/hours per week***	:	**2 sks / 4 jam per minggu** ***2 credits/ 4 hours per week***
Semester ***Semester***	:	**6 (Enam)** ***6 (six)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menerapkan pengetahuan terkait dengan Sistem komunikasi video dan Televisi siaran digital melalui satelit, kabel, dan terrestrial
Capable to apply knowledges of video communication systems and broadcast digital television via satellite, cable, and terrestrial

b. Mampu menganalisa pemakaian perangkat Sistem komunikasi video dan Televisi siaran digital melalui satelit, kabel, dan terrestrial
Capable to analyze the use of broadcast digital television and video communication systems via satellite, cable, and terrestrial

c. Mampu menganalisa dan mengimplementasikan Sistem komunikasi video dan Televisi siaran digital melalui satelit, kabel, dan terrestrial yang memenuhi kriteria implementasi yang ditetapkan dengan mempertimbangkan standar teknis, aspek kinerja, keandalan, kemudahan penerapan.
Capable to analyze and implementing video communication systems and broadcast digital television via satellite, cable, and terrestrial in accordance with the design criteria by considering technical standards, aspects of performance, reliability, ease of application.

Pokok Bahasan
Main Course

1. Pengukuran Sinyal Video Analog, meliputi; sinyal video komposit dan sinyal video pattern pada penerima televisi
   Analog Video Signal Measurement, including; composite video signal and pattern video signal on television receiver
2. Pengukuran Sinyal DVBS, meliputi; Signal level, Bit error rate, CNR (carrier/noise ratio), Eb/No, Modulation error ratio (MER), Shoulder attenuation.
   DVBS Signal Measurement, including; Signal level, Bit error rate, CNR (carrier/noise ratio), Eb/No, Modulation error ratio (MER), Shoulder attenuation
3. Pengukuran Sinyal DVBC, meliputi; Signal level, CNR and SNR, I/Q modulator errors, Interferers, Phase jitter, Echoes in the cable, Frequency response, Bit error ratio, Modulation error ratio and error vector magnitude
   Measuring of DVBC Signals, including; Signal level, CNR and SNR, I/Q modulator errors, Interferers, Phase jitter, Echoes in the cable, Frequency response, Bit error ratio, Modulation error ratio and error vector magnitude
4. Pengukuran Sinyal DVBT, meliputi; Noise (AWGN), Phase jitter, Interferers, Multipath reception, Interference with the adjacent channels (shoulder attenuation), dan I/Q errors of the modulator
   Measuring of DVBT Signals, including; Noise (AWGN), Phase jitter, Interferers, Multipath reception, Interference with the adjacent channels (shoulder attenuation), and I/Q errors of the modulator
5. Pengukuran Sinyal DVBT2, meliputi; RF leve, Bit Error Rate (BER), Modulation Error Ratios (MER), Shoulder attenuation
   Measuring of DVBT2 Signal, including; RF level, Bit Error Rate (BER), Modulation Error Ratios (MER), Shoulder attenuation

Referensi
Reference(s)

Walter Fischer, 2010, "Digital Video and Audio Broadcasting Technology", 4th edition, Newyork.
John Arnold, 2007, "Digital Television Technology and Standards", Australia.
Ulrich Reimers, 2005, "DVB The Family of International Standards for Digital Video Broadcasting", 2nd Edition, Newyork
Wes Simpson & Howard Greenfield, 2007, IPTV and Internet Video: New Markets in Television Broadcasting, USA

Mata Kuliah ***Course Name***	**:**	**Praktikum Sistem Komunikasi Fiber Optik** ***Practicum of Optical Fiber Communication System***
Kode Mata Kuliah ***Course Code***	**:**	**RTD216107** ***RTD216107***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	**:**	**2 sks / 4 jam per minggu** ***2 credits / 4 hours per week***
Semester ***Semester***	**:**	**6 (Enam)** **6 (*Six*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu menguasai teknik instalasi fiber optik
   Students are able to master fiber optic installation technique
b. Mahasiswa mampu mendesain, menginstalasi jaringan fiber optik dengan benar dan dapat dipertanggung jawabkan.
   Students are able to design and install fiber optic network correctly and responsibly.

Pokok Bahasan
Main Subjects

1. Pengenalan peralatan-peralatan pengujian fiber optik
   Introduction of fiber optic testing equipment
2. Praktikum pengupasan kabel
   Cable stripping practicum
3. Praktikum pemasangan jenis-jenis konektor Fiber optik
   Practicum of installation of fiber optic connectors
4. Praktikum konstruksi kabel fiber optik dengan mikroskop fiber optik
   Fiber optic cable construction practicum with fiber optic microscope
5. Praktikum pengukuran redaman kabel fiber optik
   Measurement of fiber optic cable attenuation practicum
6. Praktikum penyambungan kabel fiber optik (termination and splicing)
   Splicing of fiber optic cables (termination and splicing) practicum
7. Praktikum pengukuran menggunakan OTDR
   Measurement using OTDR practicum
8. Instalasi fiber optik dan pengukuran link budget menggunakan software optic system
   Fiber optic installation and link budget measurement using optical system software

Referensi
Reference(s)

Commscope, Broadband Application and Construction Manual, USA, 2014 TheFOA.org, Guide to Fiber Optic Installation, Fallbrook, California, 2014 John Gowar, Optical Communication System
Harry J.R. Dutton, Understanding Optical Communication, IBM Corporation, 1998.

Nama Mata Kuliah ***Course Name***	:	**Praktikum Sistem Komunikasi Radio** ***Practicum of Radio Communication System***
Kode Mata Kuliah ***Course Code***	:	**RTD216108** ***RTD216108***
Jumlah sks/Jam per minggu ***Number of credits/hours per week***	:	**2 sks / 4 jam per minggu** ***2 credits/ 4 hours per week***
Semester ***Semester***	:	**6 (Enam)** ***6 (six)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menerapkan pengetahuan di bidang Sistem komunikasi radio terestrial line of sight dan diversity.
   Capable to apply knowledge of line of sight terrestrial radio communication system dan diversity.
b. Mampu menganalisa pemakaian perangkat sistem telekomunikasi radio terestrial line of sight and diversity.
   Capable to analyze the use of line of sight terrestrial radio telecommunications system equipment and diversity
c. Mampu merancang dan mengimplementasikan sistem telekomunikasi radio terestrial line of sight termasuk diversity yang memenuhi kriteria desain yang ditetapkan dengan mempertimbangkan standar teknis, aspek kinerja, keandalan, kemudahan penerapan.
   Capable to design and implement a line of sight terrestrial radio telecommunications system and diversity in accordance with the design criteria by considering technical standards, aspects of performance, reliability, ease of application

Pokok Bahasan
Main Course

1. Mengenal sistem koordinat, menentukan jarak di antara dua koordinat, mengoperasikan dan Implementasi perangkat kerja (tools) survey site (GPS dan Kompas), dengan melakukan Survey di Lapangan untuk mengidentifikasi dan menentukan dua lokasi/site (near end dan far end) terkait kebutuhan aplikasi sistem telekomunikasi radio gelombang mikro
   Know the coordinate system, determine the distance between two coordinates, operate and implement site survey tools (GPS and Compass), by conducting a Field Survey to identify and determine two related locations/sites (near end and far end). Microwave radio telecommunication system application requirements
2. Menganalisa Fresnel zone dan Menentukan Tinggi Antena menggunakan Map Profile K=4/3.
   Analyzing the Fresnel zone and Determining of Antenna Height using Map Profile K=4/3
3. Menganalisa keberadaan obstacle pada link komunikasi radio gelombang mikro line of sight di antara dua titik/site secara manual menggunakan map profile K = 4/3, serta melakukan simulasi untuk menentukan tinggi antena secara optimal.
   Analyzing the manually presence of obstacles on the line of sight microwave radio communication link between two points/sites using a map profile K = 4/3, and carry out simulations to determine the optimal antenna height.
4. Mengimplementasikan software aplikasi pathlos untuk analisa dan desain sistem komunikasi radio LOS
   Implementing pathlos application software for analysis and design of LOS radio communication systems
5. Melakukan survey di lapangan untuk identifikasi dan klarifikasi dua site (near dan far end) termasuk routing keberadaan obstacle terkait dengan perencanaan dan bagaimana mengimplementasikan sistem komunikasi radio gelombang mikro line of sight secara nyata di lapangan
   Carry out field surveys for identification and clarification of two sites (near and far end) including routing the presence of obstacles related to planning and how to implement a line of sight microwave radio communication system in real in the field
6. Mengimplementasikan Pathlos V-4.0 untuk perencanaan dan analisa system komunikasi radio line of sight.
   Implementing Pathlos V-4.0 for planning and analysis of line of sight radio communication systems.
7. Melakukan Simulasi dan perencanaan system komunikasi radio LOS terkait aplikasi space diversity antenna menggunakan software aplikasi Pathlos V-4.0
   Simulation and planning of LOS radio communication systems related to the applications of space diversity antenna using Pathlos V-4.0.

Referensi
Reference(s)

Hudiono, 2020, "Jobsheet Praktek Sistem Telekomunikasi Radio Line of Sight", Politeknik Negeri Malang.
Hudiono, 2017, "Buku Ajar Sistem Komunikasi Radio dan Laboratorium", Politeknik Negeri Malang.
Roger L. Freeman, 2007, "Radio System Design For Telecommunications", Third Edition, The Institute of Electrical and Electronic Engineer, Inc, New York
Theodore_S._Rappaport, 2007, Introduction to wireless communication system, USA

Mata Kuliah ***Course Name***	:	**Sistem Komunikasi Satelit** ***Satellite Communication System***
Kode Mata Kuliah ***Course Code***	:	**RTD216109** ***RTD216109***
Jumlah sks/Jam per minggu ***Number of Credits/Hour per Week***	:	**2 sks / 3 jam per minggu** ***2 credits/ 3 hours per week***

Semester ***Semester***	:	**6 (Enam)** **6 (*Six*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa mampu memahami jenis, mekanisme, dan proses penempatan satelit di orbit
Students are able to understand the types, mechanisms, and processes of placing satellites in orbit
b. Mahasiswa mampu merencanakan sistem komunikasi satelit
Students are able to plan satellite communication systems
c. Mahasiswa mampu merencanakan jaringan satelit
Students are able to plan satellite networks
d. Mahasiswa mampu menganalisis kinerja sistem serta jaringan komunikasi satelit.
Students are able to analyze the performance of satellite communication systems and networks
e. Mahasiswa mampu menentukan pengarahan antena stasiun bumi
Students are able to determine the direction of the earth station antenna

Pokok Bahasan
Main Subject

1. Orbit satelit; pengarahan antena stasiun bumi;
Satellite orbit; earth station antenna alignment
2. Teknologi satelit; ruas bumi dan ruas angkasa;
Satellite technology; the earth segment and the celestial segment
3. FEC (Forward Error Correction)
Forward Error Correction
4. Link budget dan manajemen bandwidth
Link budget and bandwidth management
5. Implikasi kondisi propagasi pada sistem komunikasi satelit: teknik modulasi, sistem akses jamak, kendali kesalahan;
Implications of propagation conditions on satellite communication systems: modulation techniques, multiple access systems, error control
6. Jaringan satelit seluler: satelit multibeam, interferensi untuk sistem TDMA dan CDMA, jaringan satelit LEO/MEO;
Mobile satellite network: multibeam satellite, interference for TDMA and CDMA systems, LEO/MEO satellite network
7. Jaringan satelit pita lebar: masalah-masalah dalam penerapan jaringan ATM dan IP dengan satelit; jaringan satelit pita lebar berbasis ATM; kapasitas jaringan satelit pita lebar;
Broadband satellite network: problems in implementing ATM and IP networks with satellite; ATM-based broadband satellite network; broadband satellite network capacity;
8. Penggunaan perangkat jaringan VSAT.
The using of VSAT network devices.

Referensi
Reference(s)

Maral, Gerard, Michel Bousquet, Satellite Communications Systems, 5th Ed, John Wiley & Sons, 2009
Roddy, 2001, "Satellite Communications", 3rd Ed., McGraw-Hill,
E. Lutz, M. Werner, A. Jahn, 2000, "Satellite Systems for Personal and Broadband Communications", Springer.
Bruce R. Elbert, 2004, The Satellite Communication Applications Handbook, Second Edition, Artech House, Inc, London.

Mata Kuliah ***Course Name***	:	**Sistem Telekomunikasi Lanjut** ***Advanced Telecommunication Systemm***

Kode Mata Kuliah ***Course Code***	:	**RTD216201** ***RTD216201***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**6 (Enam)** ***6 (Six)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

Mampu menjelaskan konsep sistem telekomunikasi generasi lanjut dengan baik dan benar sesuai dengan referensi yang berlaku

Able to explain the concept of the next generation telecommunications system properly and correctly in accordance with applicable references

Pokok Bahasan
Main Subjects

1. Sistem Massive MIMO
   Massive MIMO System
2. Sistem Cell Free Massive MIMO
   Cell Free Massive MIMO System
3. Non-Orthogonal Multiple Access (NOMA)
   Non-Orthogonal Multiple Access (NOMA)
4. Rate-Splitting Multiple Access (RSMA)
   Rate-Splitting Multiple Access (RSMA)
5. Intelligent Reflecting Surface (IRS)
   Intelligent Reflecting Surface (IRS)
6. Edge Computing
   Edge Computing
7. Software Define Network
   Software Define Network

Referensi
Reference(s)

E. Björnson, J. Hoydis, and L. Sanguinetti, Massive MIMO Networks, vol. 11, no. 3–4. 2017.

Ö. T. Demir, E. Björnson, and L. Sanguinetti, Foundations of user-centric cell-free massive MIMO, vol. 14, no. 3–4. 2021.

W. Saad, M. Bennis, and M. Chen, "A Vision of 6G Wireless Systems: Applications, Trends, Technologies, and Open Research Problems," IEEE Netw., vol. 34, no. 3, pp. 134–142, 2020.

Y. L. Lee, D. Qin, L.-C. Wang, and G. H. Sim, "6G Massive Radio Access Networks: Key Applications, Requirements and Challenges," IEEE Open J. Veh. Technol., vol. 2, no. October 2020, pp. 54–66, 2020.

E. J. Kitindi, S. Fu, Y. Jia, A. Kabir, and Y. Wang, "Wireless Network Virtualization with SDN and C-RAN for 5G Networks: Requirements, Opportunities, and Challenges," IEEE Access, vol. 5, pp. 19099–19115, 2017.

Mata Kuliah ***Course Name***	:	**Jaringan Ad-Hoc Nirkabel** ***Ad-Hoc Wireless Network***
Kode Mata Kuliah ***Course Code***	:	**RTD216202** ***RTD216202***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**6 (Enam)** ***6 (Six)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah

Learning Outcomes Imposed on Course
a. Mahasiswa mampu memahami konsep Jaringan Wireless Ad-Hoc *Students are able to understand the concept of Wireless Ad-Hoc Network* b. Mahasiswa mampu merancang Jaringan Wireless Ad-Hoc *Students are able to design a Wireless Ad-Hoc Network* c. Mahasiswa mengetahui masalah keamanan dan energi Jaringan Wireless-Ad-Hoc *Students know the security and energy issues of Wireless-Ad-Hoc Network*
Pokok Bahasan ***Main Subjects***
1. Konsep dasar Ad-Hoc Wireless Network. *The basic concept of Ad-Hoc Wireless Network.* 2. Protokol MAC : Perancangan, fungsi/tujuan dan klasifikasi *MAC Protocol : Design, function/purpose and classification* MAC Protocols: Design issues, goals and classification. *MAC Protocols: Design issues, goals and classification.* 3. Protokol Jaringan *Network Protocol* 4. Routing Protocols *Routing Protocols* 5. Layer Transport, energi dan keamanan *Transport Layer, energy and security* 6. End – End Delivery and Security: Transport Layer *End – End Delivery and Security: Transport Layer* 7. Desain Antar Layer *Cross Layer Design*
Referensi ***Reference(s)***
C. Siva Ram Murthy and B. S. Manoj, Ad hoc Wireless Networks Architecture and Protocols, 2nd edition, Pearson Edition, 2007. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile ad-hoc networking, Wiley-IEEE press, 2004. Mohammad Ilyas, The handbook of ad-hoc wireless networks, CRC press, 2002. T. Camp, J. Boleng, and V. Davies " A Survey of Mobility Models for Ad-hoc Network" Research, "Wireless Commun, and Mobile Comp.. Special Issue on Mobile Ad-hoc Networking Research, Trends and Applications, Vol. 2, no. 5, 2002, pp. 483 – 502. Fekri M. abduljalil and Shrikant K. Bodhe, A survey of integrating IP mobility protocols and Mobile Ad-hoc networks, IEEE communication Survey and tutorials, no: 12007

Mata Kuliah ***Course Name***	:	**Pembelajaran di luar Kampus/ 8 pilar** ***Off campus Learning***
Kode Mata Kuliah ***Course Code***	:	**RTD217203** ***RTD217203***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**10 sks / 20 jam per minggu** ***10 credits / 20 hours per week***
Semester ***Semester***	:	**7 (Tujuh)** **7 (Seven)**
Capaian Pembelajaran yang Dibebankan pada Mata Kuliah ***Learning Outcomes Imposed on Course***		

Pokok Bahasan *Main Subjects*
Referensi *Reference(s)*

Mata Kuliah *Course Name*	:	**Magang Industri** *Industrial Internship*
Kode Mata Kuliah *Course Code*	:	**RTD217201** *RTD217201*
Jumlah sks/ Jam per minggu *Number of credits/ Hours per week*	:	**20 sks / 40 jam per minggu** *20 credits / 40 hours per week*
Semester *Semester*	:	**7 (Tujuh)** **7 (Seven)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa dapat membuat laporan magang industri yang berisikan tentang sejarah singkat perusahaan tempat dilakukan magang, penjelasan tentang permasalahan yang ditemui di tempat magang dan solusi yang ditawarkan.
Students can make a report which contains a brief history of the company where on the internship are carried out, an explanation of the problems encountered in the practical workplace and the solutions offered.
b. Mahasiswa dapat menjelaskan dan mempertahankan isi laporan pada saat ujian dihadapan pembimbing dan penguji.
Students can explain and defend the contents of the report during the exam in front of the supervisor and examiner.

Pokok Bahasan
Main Subjects

1. Pembekalan Magang Industri
Industrial Internships
2. Pengajuan Proposal Mitra kerja
Submission of Partner Proposals
3. Pembimbingan dan monitoring kegiatan
Guidance and monitoring activities
4. Materi bahasan magang ditentukan bersama pembimbing bergantung pada permasalahan yang ditemui di tempat magang
Discussion material is determined with the supervisor depending on the problems encountered in the internship place
5. Penyusunan laporan dan evaluasi
Report preparation and evaluation

Referensi
Reference(s)

Departemen PU. Penyusunan Rencana dan Program Secara Terkoordinasi. Dep. PU.1998.
Faulkner, Christine. The Essence of Human - Computer Interaction. Prentice Hall. USA. 2003.
Hadi, Soetrisno. Metodologi Riset. Yogyakarta. Gajahmada University Press. 1990.
Martin, Mike W. Ethics in Engineering. McGraw-Hill.1997.
Nippon Telegraph and Telephone Corporation. Network Planning. ---
Quinn, Michael J. Ethics for The Information Age (3rd Edition), Addison Wesley. 2008.
Spinello, Richard A. Case Studies In Information Technology Ethics. 2nd Edition. Prentice Hall. 2002.
Suharjono, Pengantar Penelitian Ilmiah, Malang, Universitas Brawijaya, Fakultas Teknik, UPT. Penerbitan. 2007.

Mata Kuliah ***Course Name***	:	**Praktek Kerja Lapangan** ***On The Job Training***
Kode Mata Kuliah ***Course Code***	:	**RTD217202** ***RTD217202***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**10 sks / 20 jam per minggu** ***10 credits / 20 hours per week***
Semester ***Semester***	:	**7 (Tujuh)** **7 (Seven)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa dapat membuat laporan PKL yang berisikan tentang sejarah singkat perusahaan tempat dilakukan PKL, penjelasan tentang permasalahan yang ditemui di tempat kerja praktek dan solusi yang ditawarkan.
Students can make a report which contains a brief history of the company where on the job training are carried out, an explanation of the problems encountered in the practical workplace and the solutions offered.
b. Mahasiswa dapat menjelaskan dan mempertahankan isi laporan pada saat ujian PKL dihadapan pembimbing dan penguji.
Students can explain and defend the contents of the report during the exam in front of the supervisor and examiner.

Pokok Bahasan
Main Subjects

1. Pembekalan PKL
On The Job Training
2. Pengajuan Proposal Mitra kerja
Submission of Partner Proposals
3. Pembimbingan dan monitoring kegiatan
Guidance and monitoring activities
4. Materi bahasan PKL ditentukan bersama pembimbing bergantung pada permasalahan yang ditemui di tempat PKL
Discussion material is determined with the supervisor depending on the problems encountered in the apprenticeship place
5. Penyusunan laporan dan evaluasi
Report preparation and evaluation

Referensi
Reference(s)

Departemen PU. Penyusunan Rencana dan Program Secara Terkoordinasi. Dep. PU.1998.
Faulkner, Christine. The Essence of Human - Computer Interaction. Prentice Hall. USA. 2003.
Hadi, Soetrisno. Metodologi Riset. Yogyakarta. Gajahmada University Press. 1990.
Martin, Mike W. Ethics in Engineering. McGraw-Hill.1997.
Nippon Telegraph and Telephone Corporation. Network Planning. ---
Quinn, Michael J. Ethics for The Information Age (3rd Edition), Addison Wesley. 2008.
Spinello, Richard A. Case Studies In Information Technology Ethics. 2nd Edition. Prentice Hall. 2002.
Suharjono, Pengantar Penelitian Ilmiah, Malang, Universitas Brawijaya, Fakultas Teknik, UPT. Penerbitan. 2007.

Mata Kuliah ***Course Name***	:	**Bahasa Inggris IV** ***English IV***
Kode Mata Kuliah ***Course Code***	:	**RTD218001** ***RTD218001***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**1 sks / 3 jam per minggu** ***1 credits / 3 hours per week***
Semester ***Semester***	:	**8 (Delapan)** **8 (*Eight*)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menjelaskan unsur-unsur kalimat dan membuat kalimat yang baik dan benar sesuai dengan tata bahasa baku bahasa Inggris.
Be Able to explain sentence elements and make good and correct sentences according to standard English grammar.
b. Mampu berbicara dan menyampaikan opini, argumentasi, pertanyaan, jawaban, dan atau sanggahan dalam kegiatan presentasi akademik.
Able to speak and convey opinions, arguments, questions, answers, and or rebuttals in academic presentation activities.
c. Mahasiswa mampu memahami percakapan (dialogue/conversation) dan ceramah (monologue) dalam bahasa Inggris.
Students are able to understand conversations (dialogue/conversation) and lectures (monologue) in English.
d. Mahasiswa dapat memahami pembuatan surat pribadi dan surat bisnis khususnya surat lamaran kerja dan daftar riwayat hidup serta siap wawancara dalam bahasa Inggris.
Students can understand the making of personal letters and business letters, especially job application letters and curriculum vitae and are ready for interviews in English.
e. Mahasiswa mampu mempersiapkan diri dengan baik untuk ujian kemampuan berbahasa Inggris seperti TOEFL.
Students are able to prepare well for English proficiency exams such as the TOEFL.

Pokok Bahasan
Main Subjects

1. Laporan teknis
Technical report
2. Komunikasi radio
Radio communications
3. Memiliki kemampuan percakapan yang lebih baik
Having better conversations skill
4. Wawancara kerja/kerja
Job/employment interview
5. Formulir lamaran kerja
Employment application form
6. Review surat lamaran dan CV
Review on application letter and CV
7. Persiapan TOEFL
TOEFL preparation

Referensi
Reference(s)

English in Electrical and Electronics Engineering
English in Focus
Oxford English for Electronics
Word Power Books 1
English for the telecommunication industry
Contoh-contoh form dari PT atau Perusahaan terkemuka

Mata Kuliah ***Course Name***	:	**Etika dan Profesi** ***Ethics and Profession***
Kode Mata Kuliah ***Course Code***	:	**RTD218002** ***RTD218002***
Jumlah sks/Jam per minggu ***Number of Credits/Hour per Week***	:	**2 sks / 2 jam per minggu** ***2 credits/ 2 hours per week***
Semester ***Semester***	:	**8 (Delapan)** ***8 (Eight)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa memahami konsep etika, profesi, dan etika profesi.
Students are able to understand the concepts of ethic, profession and professional ethics.
b. Mahasiswa memahami etika profesi keteknikan, khususnya etika profesi bidang telekomunikasi
Students are able to understand the ethics of the engineering profession (the professional ethics of the telecommunications sector)
c. Mahasiswa memahami dan menerapkan kode etik profesi, serta menghindari pelanggaran kode etik profesi
Students are able to understand and apply the professional code of ethics, and avoid violating the professional code of ethics

Pokok Bahasan
Main Subject

1. Pengertian Etika
The definition of ethic
2. Etika filsafat dan ilmu pengetahuan
Philosophy and scientific ethics
3. Pengertian profesi dan profesional
Definition of profession and professional
4. Etika profesi keteknikan
Ethics of the engineering profession
5. Standart profesi dan kompetensi
Professional and competency standards
6. Hubungan antar manusia dalam profesi
Human relations in the profession
7. Kode Etik profesi
Professional Code of Ethics
8. Tanggungjawab profesi pada masyarakat
Professional responsibility to society

Referensi
References

Entreupreneurship & Quality Management System Skill Development Program, Bandung, 2007.
Foster. 2001. *Managing Quality, an Interactive Approach*. Prentice Hall
Gitlow, Howard S.2001. *Quality Management System: A Practical Guide*. Florida USA: CRC Presss LLC.
Kawase, T. 2001. *Human Centred Problem Solving: The Management Of Improvement*. Tokyo: Asian Productivity Organization

Mata Kuliah ***Course Name***	:	**Skripsi** ***Undergraduate Thesis***
Kode Mata Kuliah	:	**RTD218103**

Course Code		***RTD218103***
Jumlah sks/ Jam per minggu ***Number of credits/ Hours per week***	:	**8 sks / 24 jam per minggu** ***8 credits / 24 hours per week***
Semester ***Semester***	:	**8 (Delapan)** **8 (Eight)**

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mahasiswa dapat menyusun Skripsi sebagai laporan hasil dari analisis, pembuatan sistem atau alat pada bidang teknik telekomunikasi yang telah dilakukan, yang berisikan latar belakang, permasalahan, tujuan, metodologi atau perancangan sistem atau alat, hasil pembahasan serta kesimpulan dan saran.
Students can compose a thesis as a report on the results of making a system or tool in the field of telecommunications engineering that has been carried out, which contains the background, problems, objectives, methodology or design of a system or tool, the results of the discussion as well as conclusions and suggestions.
b. Mahasiswa dapat menjelaskan dan mempertahankan apa yang dituliskan pada laporan skripsinya dihadapan tim penguji.
Students can explain and defend what is written on their thesis report in front of the examiner team.

Pokok Bahasan
Main Subjects

Materi bahasan bergantung pada permasalahan/topik dari judul Skripsi yang diambil.
The subject matter depends on the problem/topic of the thesis title taken.

Referensi
Reference(s)

Buku Panduan Akademik Politeknik Negeri Malang
Buku Panduan Pelaksanaan Skripsi PSJTD 2021

Nama Mata Kuliah ***Course Name***	:	**Teknik Radar** ***Radar Technique***
Kode Mata Kuliah ***Course Code***	:	**RTD218201** ***RTD218201***
Jumlah sks/Jam per minggu ***Number of credits/hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**8 (Delapan)** ***8 (eight)***

Capaian Pembelajaran yang Dibebankan pada Mata Kuliah
Learning Outcomes Imposed on Course

a. Mampu menerapkan pengetahuan di bidang Sistem komunikasi Radar
Capable to apply knowledges of Radar communication systems
b. Mampu menganalisa pemakaian perangkat sistem komunikasi Radar
Capable to analyze the use of Radar communication system devices
c. Mampu menjelaskan teknik-teknik pengolahan sinyal pada radar dengan antena tunggal maupun jamak, untuk tujuan kompresi pulsa dan penekanan clutter, optimasi arus pencatu dan konfigurasi array pada radar phased-array, dan desain waveform pada radar MIMO.
Capable to explain signal processing techniques on single and multiple antenna radars, for pulse compression and clutter suppression, feed current optimization and array configuration on phased-array radar, and waveform design on MIMO radar.

Pokok Bahasan
Main Course

1. Konsep radar
Radar concept
2. Thresholding
Thresholding
3. Kompresi pulsa
Pulse compression
4. Pengolahan Doppler
Doppler Processing
5. Penjejakan obyek bergerak
Tracking moving objects
6. Penekanan clutter
7. *Clutter suppression*
8. Konsep radar phased-array
phased-array radar concepts
9. Array sparsing
Array sparsing
10. Konsep dan aplikasi radar MIMO
MIMO radar concepts and applications
11. Desain waveform
Waveform design

Referensi
Reference(s)

Mark Richards, James Scheer, William Holm, Principles of Modern Radar Volume I: Basic Principles, SciTech, 2010.
William Melvin, James Scheer, Principles of Modern Radars Volume III: Advanced Techniques, SciTech, 2013
Wulf-Dieter Wirth, Radar Techniques Using Array Antennas, IEE, 2001.
Jian Li, Petre Stoica, MIMO Radar Signal Processing, John Wiley & Sons, 2009.

Nama Mata Kuliah ***Course Name***	:	**Navigasi dan Avionik** ***Navigation and Avionic***
Kode Mata Kuliah ***Course Code***	:	**RTD218202** ***RTD218202***
Jumlah sks/Jam per minggu ***Number of credits/hours per week***	:	**2 sks / 3 jam per minggu** ***2 credits / 3 hours per week***
Semester ***Semester***	:	**8 (Delapan)** ***8 (eight)***
Capaian Pembelajaran yang Dibebankan pada Mata Kuliah ***Learning Outcomes Imposed on Course***		

a. Mahasiswa mampu memahami sistem avionik, yang meliputi peralatan elektronik penerbangan yang mencakup seluruh sistem elektronik yang dirancang untuk digunakan di pesawat terbang.
Students are able to understand avionics systems, which include aviation electronic equipment that includes all electronic systems designed for use in aircraft.

b. Mahasiswa memiliki kompetensi dapat menjelaskan sistem avionik, meliputi: navigasi, komunikasi, monitoring sistem terbang dan mesin, sistem kendali terbang (AFCS), sistem penghindar tabrakan (CAS), sistem radar cuaca, sistem manajemen terbang, dan sistem pengendali lalu lintas pesawat (ATC), common integrator processor (CIP) dan sistem communication/navigation/identification (CNI).
Students have the competence to explain avionics systems, including: navigation, communication, flight and engine monitoring systems, flight control systems (AFCS), collision avoidance systems (CAS), weather radar systems, flight management systems, and aircraft traffic control systems (ATC), common integrator processor (CIP) and system communication/navigation/identification (CNI).

Pokok Bahasan
Main Course

1. Sistem Avionik, Navigasi, Komunikasi
   Avionics, Navigation, Communication System
2. Monitoring Sistem Terbang dan Mesin
   Monitoring of Flight Systems and Engines
3. Sistem Kendali Terbang (AFCS)
   Flight Control System (AFCS)
4. Sistem Penghindar Tabrakan (CAS)
   Collision Avoidance System (CAS)
5. Sistem Radar Cuaca
   Weather Radar System
6. Sistem Manajemen Terbang
   Flight Management System
7. Sistem Pengendali Lalu Lintas Pesawat (ATC)
   Aircraft Traffic Control System (ATC)
8. Common Integrator Processor (CIP)
   Common Integrator Processor (CIP)
9. Sistem Communication/Navigation/Identification (CNI).
   Communication/Navigation/Identification (CNI) system.

Referensi
Reference(s)

Avionics: Development and Implementation by Cary R. Spitzer (Hardcover – Dec 15, 2006)
Avionics: Development and Implementation by Cary R. Spitzer (Hardcover – Dec 15, 2006)
Principles of Avionics, 4th Edition by Albert Helfrick, Len Buckwalter, and Avionics Communications Inc. (Paperback – Jul 1, 2007)
Avionics Training: Systems, Installation, and Troubleshooting by Len Buckwalter (Paperback – Jun 30, 2005)
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