NOTE: Subjects arranged based on alphabetical order.

DEKA 1212
ALGEBRA

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Apply the properties of exponential, logarithm and complex numbers.
2. Use matrices method to solve system of linear equations.
3. Sketch the graph of a function.
4. Apply the properties of trigonometry.
5. Find the roots of a polynomials.
6. Apply the knowledge of mathematics in electrical engineering field.

Synopsis

References

DEKA 1213
PHYSICS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Explain basic concept in physics, covering aspect such as mechanics, electric and thermodynamics.
2. Use concepts systematically to solve problems.
3. Handle laboratory equipment based on correct procedures.
4. Measure accurately and present the results in a scientific report.
5. Apply physics knowledge in the engineering field.

Synopsis

References
2. J. Sanny, W. Moebs, University Physics, McGraw-Hill.
5. Husin, Rahim dan Mustamam, Fizik Asas untuk Sains & Kejuruteraan, UTM.

DEKA 1222
CALCULUS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Find limits and continuity of functions.
2. Find derivatives of algebraic, trigonometric, logarithmic, and exponential functions.
3. Find integrals of some algebraic and exponential functions.
4. Use derivative and integrals to solve engineering problems.

Synopsis
This course will discuss about Limits and continuity, Differentiation and Application of Differentiation, Integration and Application of Integration.

References

DEKA 2332
DIFFERENTIAL EQUATIONS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Define the terminologies which are commonly used in differential equations.
2. Verify that the given function is a solution of the given differential equation.
4. Find the Fourier Series of a given function.
5. Apply the knowledge of differential equations in order to solve engineering problems.

Synopsis
This subject discusses about the basic concepts of Differential Equation; First Order Differential Equation; Second Order Linear Differential Equation with constant coefficients; Laplace Transforms and Fourier series.

References

DEKA 2342
ENGINEERING MATHEMATICS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Sketch the contour map and graph for a certain function.
2. Use partial derivatives to find the approximation and extreme for certain functions.
3. Evaluate the double and triple integrals of functions using various techniques.
4. Use the techniques of integration to calculate the area and volume of the region.
5. Use vector-valued function to calculate curvature and torsion for certain functions.

Synopsis
This subject consists of three chapters: Functions of Several Variables, Multiple Integrals and Vector-valued Functions. The syllabus is extended from Calculus taken by student in Semester 2 Year 1. Its emphasize on the
concepts of the functions with severable variables, double and triple integrations and also vector-valued function, followed by learning various techniques in solving the problems.

References

DEKC 1513
MEASUREMENTS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Identify electrical quantities related to various measurement standards.
2. Calculate errors in measurement through statistical analysis.
3. Describe the application of PMMC instrument for DC ammeter and DC voltmeter.
4. Explain full and half wave rectifier in AC voltmeter design.
5. Construct and demonstrate Wheatstone bridge through experiments.

Synopsis
Prior to the lecture session, this course will be discussing on unit, dimension and standards in measurement. It touches most on the Measurement System as well as measurement instruments such as galvanometers, ammeters and voltmeters. A DC and AC Wheatstone Bridge, Potentiometers and Energy/Power measurements/Wattmeters also to be taught in this course.

References
2. Fatimah Sham Ismail, Anita Ahmad; Pengukuran dan Instrumentasi; UTM; 2002.

DEKC 3433
COMMUNICATIONS ENGINEERING

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Explain a basic knowledge on the communication engineering.
2. Define and analyze noise in communication system.
3. Describe the modulation and demodulation techniques of AM and FM.
4. Recognize the transmission and reception process of AM & FM.
5. Identify the concept of analogue and digital pulse modulation.

Synopsis
Communication systems – definitions, needs and development of communications system, types of communications system, the elements of communications system, introduction of multiplexing, Amplitude Modulation – signal analysis, modulation index, frequency spectrum, AM transmission – DSBSC, SSB, VSB transmission system. AM receiver – DSB & SSB detector, envelope detector, superheterodyne receiver, automatic gain control. Frequency modulation – frequency deviation, modulation index, Bessel function. FM transmission – modulator circuits. FM receiver – Foster Seeley, ratio detector. External noise, internal noise, noise calculation, noise factor. Comparison between AM and FM.

References

DEKC 3453
MICROPROCESSOR

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Describe the concept of microprocessor and computer system.
2. Write and debug programs using assembly language for microprocessor applications.
3. Construct microprocessor system with memory and peripheral device interfaces.
4. Interface and program the peripheral device to communicate with the microprocessor.
5. Demonstrate the practical competence using MC68000 microprocessor for software and hardware development.

Synopsis
This course is about introduction to microprocessor architecture, instruction set, addressing mode, assembly language programming and interrupt. Interfacing technique with memory device and peripheral, parallel and serial interfacing, interfacing with ADC/DAC and data sampling technique. System simulation and emulation based on microprocessor.

References

DEKC 3643
AUTOMATION

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Describe the concept of automation, the Programmable Logic Controller (PLC) and their components.
2. Write the PLC ladder diagram and instruction list program for small and simple application using programming console.
3. Draw the PLC Input and Output (I/O) connection diagram and carry out their wiring.
4. Identify automation components, external I/O devices of PLC system in terms of their symbol and connection.
5. Design, testing and commissioning simple process control using PLC based control system.

Synopsis
This subject will introduce a fundamental of the automation and manufacturing, their components such as actuators, sensors as well linear and rotary transportation devices. It will also covers on the automation control system, either using servo system, analogue or digital systems, electronic logic controlled and programmable logic controller (PLC). Computer based controlled systems such as automation work-cell and computer integrated manufacturing systems (CIMS) will also be included.

References

DEKE 2333
DIGITAL ELECTRONICS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Describe the basic numbering system including the decimal, binary, octal and hexadecimal.
2. Design and simulate basic combinational logic circuit.
3. Apply basic gates and flip-flops used in digital circuit.
4. Identify types of logic gates family within the integrated circuit (IC).
5. Describe the function of counters and adders in the digital circuits.
6. Develop the skill of critical thinking and problem solving in the engineering application as well as communication skill and teamwork spirit.

Synopsis
This course will equip students with basic principle, techniques and conventions used in digital electronic circuit design.

References

DEKE 2433
ANALOGUE ELECTRONICS I

Learning Outcomes
Upon completion this subject, the students should be able to:
1. Explain the characteristics and operation of semiconductor, diode, BJT and FET.
2. Explore the applications of diode, BJT and FET.
3. Analyze the operation and characteristics of diode, BJT and FET.
4. demonstrate practical competence on diode and BJT application circuits.
5. Explain the operation and characteristics of power amplifier.

Synopsis
Semiconductor theories - introduction, atomic structure, covalent bonding, majority and minority carrier, p-n junction. Diode - introduction, characteristics & parameters of diode, diode equivalent circuit, types of diode, analysis and application. Bipolar junction transistor (BJT) - introduction, dc analysis, construction, transistor operation, shape and symbol, configuration, limit of operation, transistor specification, dc biasing, bias stabilization. BJT - introduction, ac analysis, hybrid equivalent circuit, equivalent circuit for all biasing, amplification circuit with Rs and Rr, two port system. FET - introduction, structure, characteristics, types of bias, transfer characteristics curve, small signal analysis, frequency response and amplifier multi stage. Power Amplifier - Introduction to amplifier classes, circuit & operation difference for each classes, distortion within the amplifier and power transistor heat sinking.

Practical
During this subject, students will conduct the experiment related with diode, BJT, FET and Power Amplifier.

References

DEKE 2443
ANALOGUE ELECTRONICS II

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Explain the operation of operational amplifier, voltage regulator, feedback circuit, oscillator and active filter.
2. Analyze the operational amplifier, voltage regulator, feedback circuit, oscillator and active filter characteristics and application.
3. Apply the operational amplifier, voltage regulator, feedback circuit, oscillator and active filter for industrial electronics application.
4. Conduct and demonstrates practical experiments of operational amplifier, voltage regulator, feedback circuit, oscillator and active filter.
5. Simulates the operation of operational amplifier, voltage regulator, feedback circuit, oscillator and active filter by using the simulation software (PSpice).

Synopsis

References

DEKE 3443
POWER ELECTRONICS

Learning Outcomes
Upon completion this subject, the students should be able to:
1. Describe the principle and operation of power electronics, power semiconductor devices and converters
2. Explain the semiconductor power switches application in industrial practices.
3. Analyze the characteristics and performance of rectifiers, choppers and inverters.
4. Demonstrate practical competence on power electronics converters.
5. Apply the power electronics devices for switching power supplies.

Synopsis
This course is about the basic principles of power electronics, semiconductor power switches, one and three-phase inverter, the application of semiconductor devices as power electronics converters such as AC to DC, AC to AC, DC to DC and DC to AC converters, circuits as DC drives, AC drives and snubbers.

References

DEKM 2343
INTRODUCTION TO MECHATRONICS SYSTEM

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Identify and explain the basic concept and the engineering applications of Mechatronics systems.
2. Describe and relate the basic Mechatronics system with engineering application.
3. Identify the characteristics of Mechatronics system.
4. Relate machine and mechanism design with Mechatronics system.
5. Solve and analysis simple Mechatronics engineering problem.

Synopsis
Mechatronics System and Instrumentation: Static characteristic of Mechatronic systems. Dynamic analysis and precision of Mechatronic system in steady state. Analogies between electrical, mechanical, fluid and thermal
system. Sensor & actuator, load effect and signal in Mechatronic systems.


**References**

**DEKM 3753**

**ELECTRICAL MACHINES**

**Learning Outcomes**
Upon completion of this subject, the student should be able to:
1. Explain the types, physical construction and equivalent circuit diagrams of electrical machines.
2. Distinguish the characteristics of electrical machines.
3. Demonstrate the performance of electrical machines.
4. Choose suitable types of electrical machines for different applications.

**Synopsis**
This subject cover on introduction to three phase transformer, DC and AC type of electrical machines which involve physical construction, equivalent electrical circuit diagrams. The machine performances like torque, speed and efficiency are distinguished for each electrical machine types. Introduction to the starting methods and speed control techniques are also demonstrate so that better machine selection for an appropriate application.

**References**

**DEKP 1121**

**ELECTRICAL WORKSHOP I**

**Learning Outcomes**
Upon completion of this subject, the student should be able to:
1. Identify basic electrical components for domestic wiring installation.
2. Construct and demonstrate relay control circuits.
3. Describe basic electronic components and perform soldering process.
4. Apply the fundamental techniques of domestic wiring; relay control circuit wiring and PCB wiring processes.

**Synopsis**
This subject will expose student to basic domestic wiring, relay control, basic electronic components and installation. Concentration is given on the safety aspects and quality of works.

**References**
1. Abdul Samad, Amalan Pemasangan Elektrik, DBP.
2. Mohd Nazi, Teknologi Pemasangan Elektrik, DBP.
5. Acceptability of Electronic Assemblies (Revision C, 2000).

**DEKP 1213**

**ELECTRICAL CIRCUIT I**

**Learning Outcome**
Upon completion of this subject, the student should be able to:
1. Calculate current, voltage and power across any elements in a circuit.
2. Apply circuit’s laws and theorems in analyzing electrical circuits.
3. Differentiate direct current (DC) circuit and alternating current (AC) circuit.
4. Analyze AC circuit parameters
5. Analyze circuits using CAD and analysis tools (PSpice)

Synopsis

References

DEKP 2242
ELECTRICAL WORKSHOP II

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Install the basic electrical domestic wiring circuit.
2. Build the basic electrical domestic wiring.
3. Make the costing calculation for electrical wiring.
4. Apply the workshop safety rules and regulation in the electrical wiring installation.
5. Apply the computer aided drawing software AUTOCAD in the basic engineering drawing.

Synopsis
Introduction to the basic domestic wiring system. Safety practice. Cable type and size of domestic cables. Testing and troubleshooting domestic wiring. Tools and testing equipments. Introduction to the AutoCAD for 2D basic engineering drawing. Creating, editing and plotting using computer aided drawing software.

References
1. Abdul Samad, Amalan Pemasangan Elektrik, DBP.
2. Mohd Nazi, Teknologi Pemasangan Elektrik, DBP.
6. Wiring System & Motor Starter Modul 2, UTeM.

DEKP 2333
INTRODUCTION TO ELECTRICAL TECHNOLOGY

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Identify and recognise the basic electrical system components.
2. Apply and implement magnetic field’s laws such on magnetic force.
3. Investigate and explain the electromagnetic properties and laws.
4. Determines and analyze the magnetic circuits.
5. Apply and analyze the electromagnetic concepts for electrical transformer.

Synopsis
This subject introduces students to the Introduction of Electrical System, Electric & Magnetic Field, Electromagnetic, Magnetics Circuits and application of electromagnetic on electrical transformers. Topics include:
- Introduction to Electrical System - basic electrical system, electric charges, electrons, electric field & electric potential, Gauss & Coulomb’s law.
- Magnetic Field - magnetic force, torque & moment, Ampere’s law, Biot-Savart’s law.
- Electromagnetic - Magnetic flux, Faraday & Lenz Law, self induction of inductor, induces EMF.
- Magnetic circuit - series & parallel magnetic circuit, back emf in dc motor.
- Electrical transformers - single phase transformer, equivalent circuit, open & short circuit test, efficiency, voltage regulation.

References

DEKP 3353
ENGINEERING PRACTICE

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Describe the basic principle and requirements for low voltage electrical wiring system.
2. Apply the regulation and standard requirements for low voltage electrical wiring system.
3. Determine the types and characteristics of the low voltage circuit breakers and power cables.
4. Implement the basic inspection, testing and commissioning of low voltage electrical wiring system installation according to BS7671 standards.
5. Demonstrate basic works of low voltage electrical wiring system installation.

Synopsis
The purpose of this subject is to introduce students with principle and fundamental on industrial wiring, commercial building wiring, distribution board, cables and circuit breaker selection. This subject will cover the procedures on safety, basic design, setting up protection relays, inspection, testing and commissioning of an electrical installation.

References

DEKP 3463
DIPLOMA PROJECT

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Manipulate and use all of their knowledge and skills to finish the project.
2. Think objectively, critically and analytically in determining and solving problems systematically.
3. Manage time, cost and equipment skilfully.
4. Convert results from the project into oral and written form.

Synopsis
This subject gives students an opportunity to practice the knowledge that they have learnt. At the end of semester, students are required to present their project achievement in oral presentation and submit a comprehensive project report. Student’s performance will be evaluated base on project achievement, presentation and project report.

References
References depend on the project title.

DEKP 3763
POWER SYSTEM

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Describe the basic concept of power system and their components.
2. Describe the basic principle and requirements for transmission and distribution system.
3. Calculate voltages, currents, power factors and efficiency of the transmission lines.
4. Calculate the fault level and short circuit current for symmetrical fault and asymmetrical faults.
5. Explain the basic principle and requirements for overhead lines and underground cable, type of insulation, testing and commissioning, condition monitoring and maintenance.

Synopsis
The purpose of this subject is to introduce students with basic concept of power system; components of power system such as synchronize machines, automatic voltage regulator, overhead lines, transformer, switching and protection equipments. Explain theories of symmetrical components for fault analysis, voltage control and reactance power, overhead lines and underground cables analysis. Besides, students will be exposing to the requirement of condition monitoring and maintenance.

References

DEKU 2363
INDUSTRIAL TRAINING

Learning Outcomes
Upon completion this subject, the student should be able to:
1. Acquire an early stage working experience that is related to electrical engineering.
2. Develop and practice the positive attitude and be prepared for a real working environment.
3. Enhance and apply professional skills and knowledge that are highly relevant to the needs of today’s workforce and industry.
4. Contribute creative ideas in solving engineering problems.
5. Present a report in oral and written about working experiences.

Synopsis
Industrial training is compulsory to students of Diploma in Electrical Engineering to graduate. Students will undergo industrial training after semester 4 of studies for a 10-week period of training at respective industrial companies. During the training period, the students will be continuously supervised by the industrial supervisor as well as supervision by the lecturers from Faculty. Students are required to record their daily activities in the logbook that been provided by Faculty. After completing the industrial training, students have to submit a formal report following the Faculty’s format. Evaluation will based on companies supervisor report, logbook and final report is the component for industrial evaluation for the grade either pass or fail.

References

DITG 1112
COMPUTER SKILLS

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Learn the parts and types of computers.
2. Learn assembly of hardware and troubleshooting.
3. Learn how to create partition, format a computer, and install and operating system.
4. Learn and construct simple programming using C++.
5. Learn to use application software to process words, electronic display, presentation and database.

Synopsis
To give students exposure and knowledge about basic things in the field of ICT such as basic computer components, operating systems, application software, system development life cycle, network and internet. Introduction to computer: history, evolution and specification, exposure to computer hardware. Introduction to software system, operation and application (word processing, electronic display, presentation, network), programming and combining system methodology. Exposure regarding data communication, networking and internet.

References

DITG 1113
COMPUTER PROGRAMMING

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. Write a program to solve a problem statement.
2. Design problem solving method using engineering softwares.
3. Develop a program using suitable programming techniques.
4. Develop a medium level C++ program.

Synopsis

References

DMCG 1323
INTRODUCTION TO MECHANICAL SYSTEM

Learning Outcomes
Upon completion of this subject, the student should be able to:
1. define the general terms in basic mechanical system engineering
2. explain the general principles of static and mechanics
3. analyze the mechanical properties of materials
4. describe the basic concepts of dynamics and thermodynamics
5. conduct and demonstrate the basic practical works of mechanical system
Synopsis
Introduction to basic concepts in static and mechanics as a study of physical sciences, system of units, scalars and vectors, free body diagram, various types of structures, stress, strain, principles of dynamics based on kinetic and kinematics and basic concepts of thermodynamics

References

SERVICE SUBJECTS
(FPTT, PBPI & CO-CURRICULUM UNIT)
- DKKX 2XX1 CO-CURRICULUM I &II
- DLHW 1012 FOUNDATION ENGLISH
- DLHW 1702 TAMADUN ISLAM DAN TAMADUN ASIA (TITAS)
- DLHW 1722 SCIENCE & TECHNOLOGY PHILOSOPHY OR DLHW 1732 SOCIO-ECONOMIC DEVELOPMENT
- DLHW 2402 TECHNICAL COMMUNICATION I
- DLHW 2712 ETHNIC RELATIONS
- DLHC 3012 NEGOTIATION SKILLS OR DLHC 3022

CRITICAL & CREATIVE THINKING
- DLHW 3402 TECHNICAL COMMUNICATION II

Please refer to the PUSAT BAHASA & PEMBANGUNAN INSAN (PBPI) handbook for further information on the offered subjects.
- DTKW 1012 FUNDAMENTAL OF ENTREPRENEURSHIP CULTURE
- DACA 4142 ENTREPRENEURSHIP TECHNOLOGY

Please refer to the Faculty of Technology Management & technoprenuership (FPTT) handbook for further information on the offered subjects.