

الجمهورية الجزائرية الديمقراطية الشعبية

People's Democratic Republic of Algeria

وزارة التعليم العالي والبحث العلمي

Ministry of Higher Education and Scientific Research

TRAINING OFFER

L.M.D.

ACADEMIC LICENSE

NATIONAL PROGRAM

2018-1019

Domain	Field	Specialty
Sciences and Technologies	Electronics	Electronics

I. Detailed program by subject

Semester 5

Teaching unit: UEF 3.1.1

Subject 1: Microprocessor systems

VHS: 67H30 (Course: 3H00, TD: 1H30)

Credits: 6

Coefficient: 3

Objective of education:

Continue the study of sequential circuits started in semester S4. Teach the student the architecture, operation and programming of an 8-bit microprocessor, finally make him acquire the working mechanisms of a microprocessor system (interfacing, interruption) as well as its programming in assembler.

Content of the subject:

Chapter 1. Solid-state memories

Chapter 2. History and evolution of computers

Chapter 3: Study of an 8-bit microprocessor

Chapter 4. Input/output interfaces

Chapter 5. Interruptions

Teaching unit: UEF 3.1.1

Subject 2: Functions of Electronics

VHS: 45h00 (Course: 1h30, TD: 1h30)

Credits: 4

Coefficient: 2

Objective of education:

The objective of this subject is to acquire the basic theoretical knowledge on various electronic functions necessary for designing and implementing a transmission system. Functions as diverse as analog filters, amplitude, frequency and phase modulations and demodulations, PLL,... etc. are processed.

Content of the subject:

Chapter 1. Analog filters

Chapter 2. Amplitude modulation and demodulation

Chapter 3. Angular modulations and demodulations (FM and PM)

Chapter 4. Phase Lock Loop (PLL)

Chapter 5. Introduction to Digital Modulation

Teaching unit: UEF 3.1.2

Material 1: Signal processing

VHS: 45h00 (Course: 1h30, TD: 1h30)

Credits: 4

Coefficient: 2

Objective of education:

Introducing the student to digital signal processing techniques such as spectral analysis and digital filtering.

Content of the subject:

Chapter 1. Reminders of the main findings of Signal Theory

Chapter 2. Random processes

Chapter 3. Analysis and synthesis of analog filters

Chapter 4. Signal sampling

Chapter 5. Transformed Discrete

Teaching unit: UEF 3.1.2
Subject 2: Local computer networks
VHS: 45h00 (Course: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Objective of education:

Introduce students to the world of telecommunications by teaching them basic concepts on traditional and emerging local computer networks. Master the specific constraints of local networks. Choose a local network and associated equipment. Sizing, installing, configuring, diagnosing a local network.

Content of the subject:

Chapter 1. Data Transmission Concepts
Chapter 2. Local networks
Chapter 3. Ethernet Network
Chapter 4. TCP/IP Protocol
Chapter 5. Wireless local area networks (WIFI)

Teaching unit: UEM3.1
Subject 1: TP Microprocessor Systems
VHS: 22H30 (TP: 1h30)
Credits: 2
Coefficient: 1

Objective of education:

Based on knowledge of the internal architecture of a specific 8-bit microprocessor, the related I/O circuits as well as the operation of the associated instruction set, the student will be able to design interface, program a microprocessor system for a defined application.

Content of the subject:

TP1: Familiarization with the didactic kit dedicated to the 8-bit microprocessor.
TP2: Use of transfer instructions, arithmetic and logic instructions.
TP3: Use of connection instructions and programming loop techniques.
TP4: Writing and simulating assembly programs
TP5: Use stack management and input/output instructions.
TP6: Assembly programming of I/O interface circuits (parallel, serial,.)

Teaching unit: UEM3.1
Subject 2: TP Functions of the Electronics
VHS: 22h30 (TP: 1h30)
Credits: 2
Coefficient: 1

Objective of education:

Consolidate the knowledge acquired in the subject "Functions of Electronics" through practical work to better understand and assimilate the content of this subject.

Content of the subject:

TP1: Study of active filters.
TP2: Study of amplitude modulation, study of amplitude demodulation
TP3: Study of frequency modulation, study of frequency demodulation
TP4: Principle of the FI amplification with AM and CAG detector (automatic gain control).

Teaching unit: UEM3.1
Subject 3: TP Signal and Local Networks
VHS: 22h30 (TP: 1h30)
Credits: 2
Coefficient: 1

Objective of education:

Consolidation of the acquired theory and signal processing using a scientific programming language (Matlab, Scilab or Mathématique,...). The student is introduced to preparing wiring for a network and creating a network using a switch.

Content of the subject:

TP of Signal processing

TP1: Getting started with Matlab, Reminders on usual commands

TP2: Signal generation and display

TP3: Fourier series

TP4: Direct and inverse fast Fourier transform (fft, ifft)

TP5: Analysis and synthesis of analog filters

TP6: Analysis and synthesis of digital filters

TP7: Random processes

Local computer networks:

TP1: Realization and tests of RJ45 cables or twisted pair (crossed, straight).

TP2: Implementation of a peer-to-peer network between two PCs (IP addressing, file sharing).

TP3: Configuration and implementation of a multi-station network with switches (IP addressing, tests with ipconfig, ping, arp, tracert, etc.).

TP4: Implementation of a WiFi network and configuration of an access point (static and dynamic IP addressing by DHCP, securing the access point, etc.)

TP5: Operation of TCP/IP protocols Encapsulation process by data frame analysis (Using Wireshark).

Teaching unit: UEM3.1

Subject 4: Preliminary work

VHS: 37h30 (Course: 1h30, TP: 1h00)

Credits: 3

Coefficient: 2

Objective of education:

This subject concerns the design of simple electronic assemblies: analysis, principle of operation, calculation of components and realization. It allows the student to put into practice the knowledge acquired during their training by performing analog or digital electronic functions on printed circuits.

Content of the subject:

Chapter 1. Drawing techniques in electronics

Chapter 2. Electronic Schematics Technology

Chapter 3. Wiring technique for electronic circuits

Chapter 4. Basic principles of electronic circuit troubleshooting

Content of the Practical Work section

Mini project 1: Study and realization of a conventional 12 V DC, 5A power supply.

Mini project 2: Study and production of an audio amplifier with integrated circuits.

Mini project 3: Study and implementation of a timer and ramp generator with NE555.

Mini project 4: Study and implementation of a sequencer with logic circuits.

Mini project 5: Study and implementation of a triac dimmer.

Mini project 6: Study and realization of a sound switch.

Mini project 7: Study and implementation of a logic circuit tester.

Mini project 8: Study and implementation of a passive component curve plotter.

Mini project 9: Study and realization of a multistage amplifier.

Teaching unit: UED 3.1

Subject 1: Electronic component technology 2

VHS: 22H30 (Course: 1H30)

Credits: 1

Coefficient: 1

Objective of education:

It is a continuity of the same subject taught in S4 and consists of reviewing specific electronic devices that are usually found in electronic circuits.

Content of the subject:

Chapter 1. Power supply design

Chapter 2. Active power components

Chapter 3. Optoelectronic components

Chapter 4. TTL family circuits

Chapter 5. CMOS family circuits

Chapter 6. Special Logic Integrated Circuits (ICs)

Chapter 7. Other specific components and accessories

Teaching unit: UED 3.1

Subject 2: Integrated circuit technology and manufacturing

VHS: 22H30 (Course: 1H30)

Credits: 1

Coefficient: 1

Objective of education:

The purpose of this material is to explain in a very simplified way the processes used classically to manufacture the passive and active integrated components and to indicate the essential characteristics of the different technologies and logical families.

Content of the subject:

Chapter 1: Introduction to Microelectronics

Chapter 2: Manufacture of monocrystalline silicon substrates

Chapter 3: Silicon doping techniques

Chapter 4: Silicon oxides and nitrides

Chapter 5: Thin layers

Chapter 6: Photolithography and engraving techniques

Chapter 7: The clean room and the editing room

Chapter 8: Examples of manufacturing processes

Teaching unit: UET3.1

Matter 1: Wave propagation and Antennas

VHS: 22H30 (Course: 1H30)

Credits: 1

Coefficient: 1

Objective of education:

To provide the student with a basic understanding of the propagation principle of electromagnetic waves and the mechanisms of hertzian propagation. Calculate the different parameters applicable to antennas.

Content of the subject:

Chapter 1. Reminders on vector analysis elements.

Chapter 2. Maxwell's equations.

Chapter 3. Propagation in vacuum and dielectric media.

Chapter 4. Propagation of electromagnetic waves in conductive media.

Chapter 5. General Information on Antennas.

Chapter 6. Characteristics of some common antennas.

Semester 6

Teaching unit: UEF 3.2.1

Subject 1: Servos and regulation

VHS: 67H30 (Course: 3H00, TD: 1H30)

Credits: 6

Coefficient: 3

Objective of education:

To give students a good knowledge of the classical methods of study of servo loops, modeling of a physical process, analysis of open and closed loop performance as well as synthesis of correctors.

Content of the subject:

Chapter 1. Introduction to servitude

Chapter 2. Reminders on the Laplace Transform

Chapter 3. Modelling linear slave systems

Chapter 4. Performance of linear systems

Chapter 5. Stability

Chapter 6. The Precision of a Slave System

Chapter 7. Places of the Roots

Chapter 8. Examples of draft synthesis.

Teaching unit : UEF 3.2.1

Subject 2: Sensors and Instrumentation

VHS: 45h00 (Course: 1h30, TD: 1h30)

Credits: 4

Coefficient: 2

Objective of education:

The aim of this course is to study the digital measurement chain, the associated electronics and the different types of sensors.

Content of the subject:

Chapter 2. Some metrological features

Chapter 3. Passive sensor conditioners

Chapter 4. Signal Conditioners

Chapter 5. A few examples of sensors.

Teaching unit: UEF 3.2.2

Subject 1: Power electronics

VHS: 45h00 (Course: 1h30, TD: 1h30)

Credits: 4

Coefficient: 2

Objective of education:

Know the basic principles of power electronics, Know the operating principle and use of power components, Master the operation of major static converters, Acquire the basic knowledge for a technical choice according to the field of application of a power converter.

Content of the subject:

Chapter 1. Introduction to power electronics

Chapter 2. AC - DC Converters

Chapter 3. AC Current Converters - AC

Chapter 4. DC Converters - DC

Chapter 5. DC - AC converters.

Teaching unit: UEF 3.2.2

Subject 2: Pulse electronics

VHS: 45h00 (Course: 1h30, TD: 1h30)

Credits: 4

Coefficient: 2

Objective of education:

Introduce students to other key functions of electronics. This subject, associated with "Functions of electronics" (semester 5) and "Fundamental electronics 2" (semester 4), constitutes an entity whose overall content gives the student the ability to analyze the operation of an analog electronic system as complex as it is the detailed diagram in the manufacturer's instructions.

Content of the subject:

Chapter 1. Definitions and characteristics of the impulse

Chapter 2. RC circuit in switching

Chapter 3. Active components in switching

Chapter 4. Formatting circuits

Chapter 5. A/N and N/A converters

Chapter 6. Two-state circuits: Multivibrators

Chapter 7. Function generators.

Teaching unit: UEM3.2

Subject 1: End of Cycle Project

VHS: 45h00 (Course: 3h00)

Credits: 4

Coefficient: 2

Objective of education:

Teach the student to master laboratory measuring devices. Enable the design and simulation of analog and digital electronic circuits. Initiate the student to work in a team on a topic of greater scope than those dealt with in traditional practical works and with more autonomy.

Content of the subject:

Part A: Use of measuring equipment.

Part B: Learning a simulation software in electronics

Chapter 1: Introduction to simulation software

Chapter 2: Presentation of simulation software

Chapter 3: Digital simulation of projects

Chapter 4: Measurement instruments

Part C: Electronic editing, Drafting of the corresponding technical file. An oral defence (or poster presentation).

Teaching unit: UEM3.2

Subject 2: TP Servoing and regulation

VHS: 22h30 (TP: 1h30)

Credits: 2

Coefficient: 1

Objective of education:

Consolidate the knowledge acquired on servitude and regulation through practical work.

Content of the subject:

TP1: Upgrade for the exploitation of Matlab Toolbox/Matlab toolkits, ...

TP2: Modelling of systems under Matlab and functional diagrams.

TP3: Temporal analysis of LTI, first and second order and higher order systems and notion of dominant poles under Matlab and Simulink.

TP4: Frequency analysis of Bode, Nyquist, Black systems under Matlab and Simulink.

TP5: Stability and precision of the controlled systems.

TP6: Synthesis of a phase advance corrector, frequency response method.

TP7: Analysis and adjustment of real analogue loop systems in the laboratory.

Teaching unit: UEM3.2

Subject 3:TP Sensors and Instrumentation

VHS: 22h30 (TP: 1h30)

Credits: 2

Coefficient: 1

Objective of education:

Put into practice the knowledge acquired on the sensors most often used in measurement chains.

Content of the subject:

TP1: Presentation of a complete measurement chain (sensor/conditioner).

TP2: Study of a signal conditioning circuit of a sensor: Bridge mounting, AOP mounting.

TP3: Temperature measurements: PT 100, Thermocouple, CTN, CTP.

TP4: Speed measurements.

TP5: Position and displacement measurements.

TP6: Force and deformation measurements.

TP7: Pressure, level and flow measurements.

TP8: Vibration measurements.

TP9: Photometric measurements: optical, solar cell or solar panel.

Teaching unit: UEM3.2

Material 4:TP Power and pulse electronics

VHS: 15h00 (TP: 1h00)

Credits: 1

Coefficient: 1

Objective of education:

Know the basic principles of power electronics and the use of power components. Gain a better knowledge of the main static converters. Generate, using electronic assemblies, different types of pulses by checking their characteristics by measurements with the oscilloscope. Learn the practical methods of generating different types of signals.

Content of the subject:

Power electronics TP:

TP1: Uncontrolled rectifiers: single phase and three phase

TP2: Rectifiers controlled: single-phase and three-phase

TP3: Choppers: series chopper, parallel chopper

TP4: Dimmers: single phase and three phase

TP5: Inverters: single phase

Pulse electronics TP:

TP1: Integrator circuit and differentiator circuit.

TP2: Limiting circuits.

TP3: Saw-tooth signal generator, triangular signal generator.

TP4: Study of an example of a CAN circuit, Study of an example of a DAC circuit.

TP5: The comparators

TP6: The astables

TP7: The monostables

TP8: Schmitt's trigger threshold circuits.

Teaching unit: UED3.2

Material 1: Optoelectronic devices

VHS: 45h00 (Course: 3h00)

Credits: 2

Coefficient: 2

Objective of education:

Acquire basic knowledge of optoelectronics. Know optoelectronic components and their uses.

Content of the subject:

Chapter 1. Interaction light-semiconductor
Chapter 2. Electronic and optical properties of semiconductors
Chapter 3. Light emitters
Chapter 4. Light detectors
Chapter 5. Optical fibres.

Teaching unit: UET3.2

Subject 1: Professional project and business management

VHS: 22h30 (Course: 1h30)

Credits: 1

Coefficient: 1

Objective of education:

Preparing for vocational integration at the end of their studies through a process of individual and collective maturation. Implement a post-graduate project (study or job search). Master the methodological tools needed to define a post-graduate project. Prepare for job search. Be aware of entrepreneurship by presenting an overview of management knowledge useful for the creation of activities.

Content of the subject:

Chapter 1. Writing cover letter, CV

Chapter 2. Documentary research on trades in the sector

Chapter 3. Conducting interviews with professionals

Chapter 4. Simulation of hiring interviews

Chapter 5. Individual and/or group presentation and discussion

Chapter 6. Project an idea, to give meaning to the individual journey.

Sequence 1. Plenary

Sequence 2. Preparation for group work.

Sequence 3. Documentary research and field interviews.

Sequence 4. Group sharing.

Sequence 5. Preparation for job search.

Sequence 6. Creation of activities; presentation of management elements related to entrepreneurship.

Sequence 7. Elaboration of the individual post-licence project.
