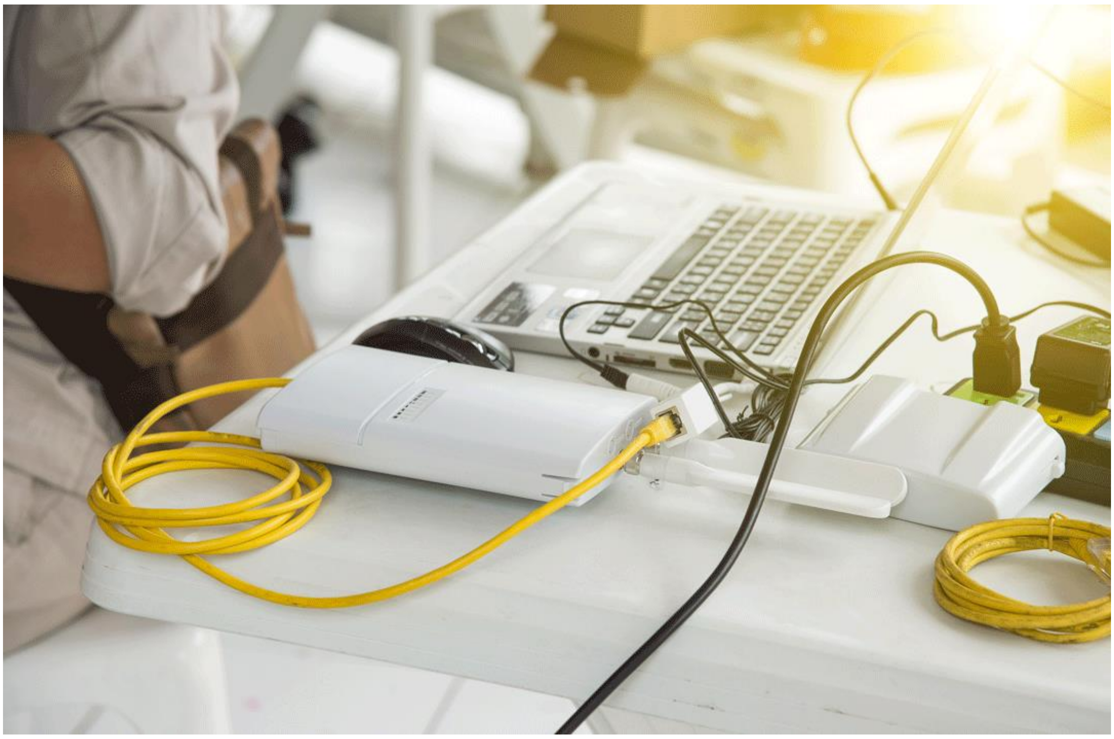
Higher Institute of Engineering in EL-Shorouk City

Department of Communications and Computer Engineering



Laboratory Manual

2024 / 2025

List of Content

Introduction:

The guide aims to introduce the specialized laboratories of the Department of Communications and Computer Engineering (Electronics and Communications Engineering Program - Computer and Control Engineering Program), their content of devices and components, and an explanation of the scientific experiments carried out in the laboratories.

1- Computer Network Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Computer Network (1) and Computer Network (2): 1. Introducing the simulation programs used and how to deal with them. 2. Network Components (Devices, Connectors, Cables, and Cards). 3. Networking tools and tests. 4. Connection Types (Straight Cable, Crossover Cable, Rollover Cable). 5. Network Topologies. 6. TCP/IP Configuration. 7. IP subnetting distribution. 8. Design and implementation of an integrated network. 9. Review on IPs and Subnetting. 10. Static Routing and Configuration. 11. RIPv2 Routing and Configuration. 12. EIGRP Routing and Configuration. 13. OSPF Routing and Configuration. 14. Telnet. 15. Wide Area Network (WAN). 16. Virtual Private Network (VPN).	1. (27 PC Dell Optlix 7080 – Core i7 – Ram 16 GB – HDD 1 T) 2. (3 PC Dell Optlix 7090 – Core i7 – Ram 16 GB – HDD 1 T) 3. (30 mouse – 30 keyboard) 4. (1 printer HP LaserJet Managed M605m) 5. (1 printer HP LaserJet Enterprise M604) 6. (3 Rack) 7. (2 switch Cisco 24 port) 8. (7 Patch Panal D-Link Cat 6) 9. (4 Huawei GPON ONU) 10.(4 Huawei Echo Life Router) 11.(2 Firewall) 12.(4 switch Huawei 24 port) 13.(1 core switch) 14.(1 Brother Printer) 15.(Fiber Cable) 16.(2) PROSKIT CP-301F4 FIBER OPTIC CRIMPING TOOL (220MM) 17.(2) PROSKTI CP-FB01 FTTHDROP CABLE STRIPPER 18.(4) PROSKTI MT-705IN MUTI-MODULAR CBLE TESTER 19.(2) PROSKTI DK-2043 FIBER OPTIC KEVLAR CUTTER 20.(2) PROSKTI CP-376KX PROFESSIONAL MODULAR CRIMPS STRIPS&CUTS TOOL (200MM) 21.(5) PUNCH DOWN/ STRIPPER 22.(1) PROSKIT MT-7508FIBER OPTIC VISUAL FAUL LOCATOR	70 m^2	Mahmoud Magdy (102 C)

17. Router Security. 18. Virtual Local Area Network (VLAN). 19. Spanning Tree Protocol (STP). 20. Border Gateway Protocol (BGP).	23.(1) PROSKIT MT-7064 POE&LAN CABLE TESTER 24.(2) PROSKIT MT-7068ALL-IN-ONE TONER& PROBE KIT 25.(4) PROSKIT 808-0376C MODULAR CRIMPING TOOL (200MM) 26.(5) Cable fiber 12 core 5m 27.(2) Cable fiber 12 core mm 28.(6) RJ 45 3com 29.(3) crimp D-Link 30.(1) RJ 45 1000pcs 31.(1) PROSKIT MT -7509 FIBER OPTIC VISUAL FAULT LOCATOR 32.(1) PROSKIT MT- 7029 NOISE-FILTERING NETWORK POE TONER & PROBE 33.(1) PROSKIT MT-7602 4 IN 1 FIBER OPTIC POWER MULTIMETER 34.(2) PROSKIT FB- 1688 FIBER CLEAVER		
	35.(2) PROSKIT DK -2026N CARBIDE FIBER SCRIBE 36.(2) PROSKIT MT- 7071 LCD CABLELENGTH TONER &PROBE KIT 37.(1) PROSKIT MT-7602 4 IN FIBER OPWER OPTIC POWER MUL TIMETER 38.(1) PROSKIT MT- 7601 FIBER OPTIC POWER METER 39.(1) RT LINK-PC-SC/LC-SM-3M 40.(700) Head shrink 6mm 41.(1) PROSKIT Fiber Optic viewing scope kit 8PK-MA009 42.(4) Round cable slitter and Ringing tool 43.(4) PROSKIT Coaxial Stripper 6PK-322 44.(1) PROSKIT SD-9808N 45.(1) Fiber Master OTDR 46.(1) MINI ARC FUSION SPLICER		(Continued) Mahmoud Magdy (102 C)


ACS

2-Communcation Systems Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Baseband Communication: 1. Sampling and Reconstruction 2. PAM and Time Division Multiplexing (TDM) 3. Pulse width Modulation & Demodulation 4. Noise in AM Communications 5. PCM Encoding and Decoding 6. PCM and TDM 7. Delta Modulation and Demodulation 8. Delta-sigma Modulation and Demodulation 9. SNR & Eye Diagrams 10. Line Coding **Digital Communication:** 1. Amplitude Shift Keying (ASK) Modulation & Demodulation 2. Frequency Shift Keying (FSK) Modulation & Demodulation 3. Binary Phase Shift Keying (BPSK) Modulation & Demodulation 4. Quadrature Phase Shift Keying (QPSK) Modulation & Demodulation 5. FFT and spectra SNR & BER measurements **Communication 1:** 1. Amplitude Modulation and Demodulation 2. Amplitude Modulation (method 2) & product detection 3. Double Side Band Modulation and Demodulation 4. Phase Division Modulation and Demodulation 5. Single Side Band Modulation and Demodulation 6. Frequency Modulation and Demodulation	1- (3) Power Supply 2- Function Generator 3- (7) Oscilloscope 4- Optical Meter 5- Multi-meter 6- MCM 40 Module 7- (3) EMONA COMMUNICATIONS-ELVIS III 8- (2) EMONA ETT-211 FIBER OPTIC COMM TRAIN FOR NI ELVIS 9- (2) NI ELVIS II+ H. W 10- (3) NI ELVIS III+ H. W 11- (11) Computers (Core i5, RAM 4G) 12- (4) Emona ETT-101 BiSKIT Telecom's Traniner 13- (4) Analog Dicovery 2 100MS/s USB Oscilliscope, Logic Analyzer and varialble Power Supply 14- Measurement unit 15- (4) BNC Adpater 16- USRP – NI 2900 17- (3) USRP – Ettus USRP Research 18- Printer HP 7110 Printer HP Laser jet 1320	65 m^2	Norhan Magdy (201 C)

Communication 2:			
1. Sampling and reconstruction 2. PAM and Time Division Multiplexing (TDM) 3. Pulse width modulation & demodulation 4. Noise in AM Communications 5. Demonstrating of superheterodyne receiver 6. Carrier acquisition using PLL			
Digital Communication:			
1. PCM Encoding and Decoding 2. Amplitude Shift Keying (ASK) Modulation & Demodulation 3. Frequency Shift Keying (FSK) Modulation & Demodulation 4. Binary Phase Shift Keying (BPSK) Modulation & Demodulation 5. Quadrature Phase Shift Keying (QPSK) Modulation & Demodulation			
Communication 1:			
1. Amplitude Modulation and Demodulation 2. Double Side Band Modulation and Demodulation 3. PCM Encoding and Decoding 4. Amplitude Shift Keying (ASK) Modulation & Demodulation 5. Frequency Shift Keying (FSK) Modulation & Demodulation 6. Binary Phase Shift Keying (BPSK) Modulation & Demodulation 7. Quadrature Phase Shift Keying (QPSK) Modulation & Demodulation			(Continued) Norhan Magdy (201 C)
Broadband Communication:			
1. Spread Spectrum – DSSS modulation and demodulation 2. Principles of OFDM 3. MATLAB Excercises			
Communication (3):			
1. PCM Encoding and Decoding 2. PCM and TDM 3. Delta Modulation and Demodulation 4. Delta-sigma Modulation and Demodulation			

<table>
<tr><td>5. SNR & Eye Diagrams
6. Line Coding
Communication (4):
1. Amplitude Shift Keying (ASK) Modulation & Demodulation
2. Frequency Shift Keying (FSK) Modulation & Demodulation
3. Binary Phase Shift Keying (BPSK) Modulation & Demodulation
4. Quadrature Phase Shift Keying (QPSK) Modulation & Demodulation
5. FFT and spectra
6. SNR & BER measurements
7. Introduction to DSSS (Spread Spectrum)
8. Principles of OFDM
Fiber optic communications:
1. Fiber optic transmission.
2. Optical signal filtering, splitting, combining.
3. Optical losses.
4. Fiber optic bi-directional communication.
5. Wave division multiplexing (WDM)
Selective course 3 (Optical fiber communication Systems):
1. Fiber optic transmission.
2. Optical signal filtering, splitting, combining.
3. Optical losses.
4. Fiber optic bi-directional communication.
5. Wave division multiplexing (WDM)</td><td></td><td></td><td>(Continued)
Norhan Magdy
(201 C)</td></tr>
</table>

3-Analog Communication Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Analog Communications: Bylaw 2019 1. Amplitude Modulation (AM, and DSB). 2. Noncoherent detection of AM modulated signal. 3. Coherent detection of AM modulated signal. 4. Single side band (SSB) modulation and demodulation. 5. Spectrum visualizer of AM,DSB, and SSB) 6. Frequency Modulation (FM). 7. Frequency Demodulation. 8. Phase Modulation (PM) and demodulation. 9. 2-Channels FDM system. 10. Radio receiver (AM/SSB/FM). **Communications (2):** Bylaw 2013 1. Pulse Modulation (PAM, PWM and PPM). 2. Time Division Multiplexing (4-PAM TDM). 3. 2-Channels FDM system. 4. FM stereo and audio amplifier. 5. PLL and application. 6. Analog TV.	1- (2) Power Supply (PS1-PSU/EV). 2- (3) Power Supply. 3- (1) Power Supply (PSU/EV). 4- (1) Programmable DC power Supply(DP831) 5- (2) Function Generators (GFG-8020H) 6- (1) Function Arbitrary waveform Generator (2 channels 25 MHz) (DG1022). 7- (3) Oscilloscope (100MHz) (DS1102). 8- (1) Oscilloscope (100MHz) (GOS-6112). 9- (3) Oscilloscope (50MHz) (CQ650C). 10- (1) Digital Multimeter (DM3058E) 11- (3) Measurements Unit Mod.(IU9/EV) 12- (1) Stereo Amplifier Training (M800/EV). 13- (2) FDM Transmitter (L03). 14- (2) FDM Receiver (L04). 15- (3) Pulse Modulations (T20A). 16- (2) 4-Channel PAM multiplex (T20D) 17- (4) T10A Module 18- (4) AM/DSB/SSB (T10B). 19- (4) IF_AM Detector (T10C). 20- (4) FM/PM (T10D). 21- (3) Noise and Audio (T10G). 22- (2) AM Transmitter (T10E). 23- (2) Insertion Faults Unit (SIS1/EV) 24- (1) Radio Transmitter (AM/SSB/FM) (MCM24). 25- (1) Radio Receiver (MCM25). 26- (5) Service and Testing Unit (T20E). 27- (1) Tuned Circuits-Filters-Networks (T10F)	40 m^2	Sameh Adel (305 C)

	28- (1) PLL and Applications (T10L). 29- (2) 4-Channel PAM multiplex (T20D) 30- (1) Colour Television Unit Mod.(M25/EV) 31- (1) Stereo Amplifier Trainer (M800/EV). 32- (1) FM transmitter 88/108 MHz (L14). 33- (1) Stereo Encoder (L13)		


Analog Communications Experiments:
- Amplitude Modulation:
AM - DSB - SSB
- Angle Modulation : (FM - PM)
- Super Heterodyne Receiver.
- FM Stereo.
- Frequency Division Multiplexing
(FDM).
- Pulse Modulation (PAM,PWM, PPM).
- Four Channel PAM Multiplexing

4-Digital Communication Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Communication (3): 1. Linear PCM 2. Companding PCM 3. Differential PCM 4. 4-Channel TDM-PCM 5. Delta modulation **Communication (4):** 1. Amplitude Shift Keying 2. Frequency Shit Keying 3. Phase shift Keying 4. Differential Phase Shift Keying 5. Quadrature Phase Shift Keying 6. 8-QAM **Optical Fiber:** 1. Attenuation of optical Fiber as function in link length 2. Attenuation of optical Fiber as function in wavelength 3. Coupling Losses and Bending Losses of Optical Fiber 4. Optical Source 5. Optical Detector	1- (9) Power Supply 2- (2) Function Generator 3- (4) Oscilloscope 4- Intelligent counter 5- (2) MCM 30 Module 6- (3) MCM 31 Module 7- MCM 32 Module 8- T20F Module 9- T20C Module 10- T20B Module	50 m^2	Eng. Wassam Abd El-Moly (104 C)

Communication and Computer Engineering Department Building (C) Internal 573

5-Electronic and Electrical Circuit Lab(1).

<table>
<tr><th>List of experiments performed in the laboratory and the name of the course serving the experiment</th><th>List of available equipment</th><th>Area in square meters</th><th>Name of the technician in the laboratory/hall</th></tr>
<tr><td>Electronic Measurements (1):
1. Measurement of unknown resistance with its included error using different methods.
2. Measuring internal voltmeter resistance and recognizing its loading effect.
3. Measuring unknown resistance using voltmeter and ohmmeter method.
4. Measuring of unknown resistance using Wheatstone bridge.
5. Measuring of unknown capacitance using Capacitance Bridge.
6. Measuring of unknown inductance using inductance bridge.
Measurements and labs (3) and Electronic Measurements (2):
1. Practical Emitter follower circuit.
2. Ramp type DVM.
3. Digital Frequency meter.
Electronics (3):
1. Inverting amplifier.
2. Non-Inverting Amplifier.
3. Integrator.
4. Differentiator.
5. Summing Amplifier.
6. Subtracting Amplifier.
7. Comparator.
8. Power Amplifier.
Electronics (4):
1. Logarithmic Amplifier.
2. Monostable multivibrator.
3. Astable Multivibrator.</td><td>1- (3) DIGITAL MUL TIMTER KEW 1011
2- (2) DIGITAL MUL TIMTER KEW 1011
3- (7) Digital Techniques model – AT-700-ATEK-CE
4- (11) FUNCTION GENERATOR (FG-220C)
5- (12) Oscilloscopes
6- M CM 8/ EV(EV/9)
7- M MCM 3/EV (EV/8)
8- (4) M MCM 3/EV (EV/3)
9- (5) M MCM 4 /EV (EV/4)
10- (3) M MCM 5 /EV (EV/5)
11- (3) M MCM 6 /EV (EV/6)
12- M MCM z10 /EV (EV/10z)
13- (3) M MCM 2 /EV II (EV/2)
14- (6) M MCM 7 /EV (EV/7)
15- (13) Power Supply
16- (7) Model at701
17- Digital multimeter – Rigol DM 3058E
18- Function generator – Rigol DG 1022
19- Programmable DC Power supply – Rigol DP 831
20- (2) NI Elvis III
21- (2) TI Analog Electronics Board for NI ELVIS III
22- (3) PC Core i5</td><td>50 m^2</td><td>Eng. Wassam Abd El-Moly (104 C)</td></tr>
</table>

Electronics (5): 1. Power electronics (Thyristor, Triack, Diack, IGBT, Sawtooth Generator)			
Electronic devices: 1. Introducing the lab instruments used and how to deal with them. 2. Diode characteristics. 3. Half and full wave rectifier with and without filter. 4. The Diode Limiter and Clampers. 5. Zener Diode Characteristics and Zener as Voltage Regulator. 6. Input and Output Characteristics of Transistor CB and CE Configuration. 7. The BJT Common Emitter Amplifier. **Circuits (1):** 1. Introducing the lab instruments used and how to deal with them. 2. Verification of Ohms law. 3. Resistance in series and parallel. 4. Voltage and current divider rule. 5. Kirchoff's voltage and current law. 6. Thevenin's and norton's theorem. 7. Series RLC circuits parallel RLC circuits. 8. AC superposition theorem. 9. AC Thevenin Theory. 10. AC maximum power transfer. 11. DC current and voltage. **Analog Electronics:** 1. JFET Biasing and amplifier. 2. Inverting Amplifier. 3. Non-inverting Amplifier. 4. Differential Amplifier. 5. Summing and Subtractor. 6. Comparator.			(Continued) Eng. Wassam Abd El-Moly (106 C)

7. Project.			
Circuit (2):			
1. Capacitor. 2. Inductor. 3. RL and RC circuit. 4. Thevenin Theory. 5. Maximum Power Transfer. 6. Low and High Pass Filter using RL and RC circuits. 7. Band Pass and Stop Filter using RLC circuit.			
Logic Circuits:			
1. Full Adder and Subtractor. 2. Half Adder. 3. Multiplier.			
Measurements and labs (4):			
1. LDR sensor. 2. Temperature Sensor. 3. TLC using Arduino			
Electronic circuit analysis			
1. Power amplifier. 2. Thyristors. 3. Multivibrators. 4. Active filters.			

6-Electronic and Electrical Circuit Lab. (2).

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Electronic Measurements (1): 1. Measurement of unknown resistance with its included error using different methods. 2. Measuring internal voltmeter resistance and recognizing its loading effect. 3. Measuring unknown resistance using voltmeter and ohmmeter method. 4. Measuring of unknown resistance using Wheatstone bridge. 5. Measuring of unknown capacitance using Capacitance Bridge. 6. Measuring of unknown inductance using inductance bridge.	1- (3) DIGITAL MUL TIMTER KEW 1011 2- (2) DIGITAL MUL TIMTER KEW 1011 3- (7) Digital Techniques model – AT-700-ATEK-CE 4- (11) FUNCTION GENERATOR (FG-220C) 5- (12) Oscilloscopes 6- M CM 8/ EV(EV/9) 7- M MCM 3/EV (EV/8) 8- (4) M MCM 3/EV (EV/3) 9- (5) M MCM 4 /EV(EV/4) 10- (3) M MCM 5 /EV(EV/5) 11- (3) M MCM 6 /EV (EV/6) 12- M MCM z10 /EV(EV/10z) 13- (3) M MCM 2 /EV II (EV/2) 14- (6) M MCM 7 /EV (EV/7) 15- (13) Power Supply 16- (7) Model at701 17- Digital multimeter – Rigol DM 3058E 18- Function generator – Rigol DG 1022 19- Programmable DC Power supply – Rigol DP 831 20- (3) NI Elvis III 21- (3) TI Analog Electronics Board for NI ELVIS III 22- (3) PC Core i5	66 m^2	Sameh Adel (306 C)
Measurements and labs (3) and Electronic Measurements (2): 1. Scale Counter. 2. Decade Counter. 3. Frequency Divider. 4. A/D converter. 5. Digital Voltmeter. 6. Digital Frequency Meter. 7. D/A converter.			
Electronics (3): 1. Inverting amplifier. 2. No- Inverting Amplifier. 3. Integrator. 4. Differentiator. 5. Summing Amplifier. 6. Subtracting Amplifier. 7. Comparator. 8. Power Amplifier.			
Electronics (4):			

1. Logarithmic Amplifier 2. Monostable multivibrator 3. Astable Multivibrator. **Electronics (5):** 1- Power electronics (Thyristor, Triack, Diack, IGBT, Sawtooth Generator).			
Electronic devices: 1. Introducing the lab instruments used and how to deal with them. 2. Diode characteristics. 3. Half and full wave rectifier with and without filter. 4. The Diode Limiter and Clampers. 5. Zener Diode Characteristics and Zener as Voltage Regulator. 6. Input and Output Characteristics of Transistor CB and CE Configuration. 7. The BJT Common Emitter Amplifier. **Circuits (1):** 1. Introducing the lab instruments used and how to deal with them. 2. Verification of Ohms law. 3. Resistance in series and parallel. 4. Voltage and current divider rule. 5. Kirchoff's voltage and current law. 6. Thevenin's and norton's theorem. 7. Series RLC circuits parallel RLC circuits. 8. AC superposition theorem. 9. AC Thevenin Theory. 10. AC maximum power transfer. 11. DC current and voltage. **Analog Electronics:** 1. JFET Biasing and amplifier. 2. Inverting Amplifier. 3. Non-inverting Amplifier. 4. Differential Amplifier.			(Continued) Sameh Adel (306 C)

5. Summing and Subtractor. 6. Comparator. 7. Project.			
Circuit (2):			
1. Capacitor and Inductor. 2. RL and RC circuit. 3. Thevenin Theory. 4. Maximum Power Transfer. 5. Low and High Pass Filter using RL and RC circuits. 6. Band Pass and Stop Filter using RLC circuit.			
Logic Circuits:			
1. Full Adder and Subtractor. 2. Half Adder. 3. Multiplier.			
Measurements and labs (4):			
1. LDR sensor. 2. Temperature Sensor. 3. TLC using Arduino.			
Electronic circuit analysis			
1. Power amplifier. 2. Thyristors. 3. Multivibrators. 4. Active filters.			

7-Software Engineering Lab.

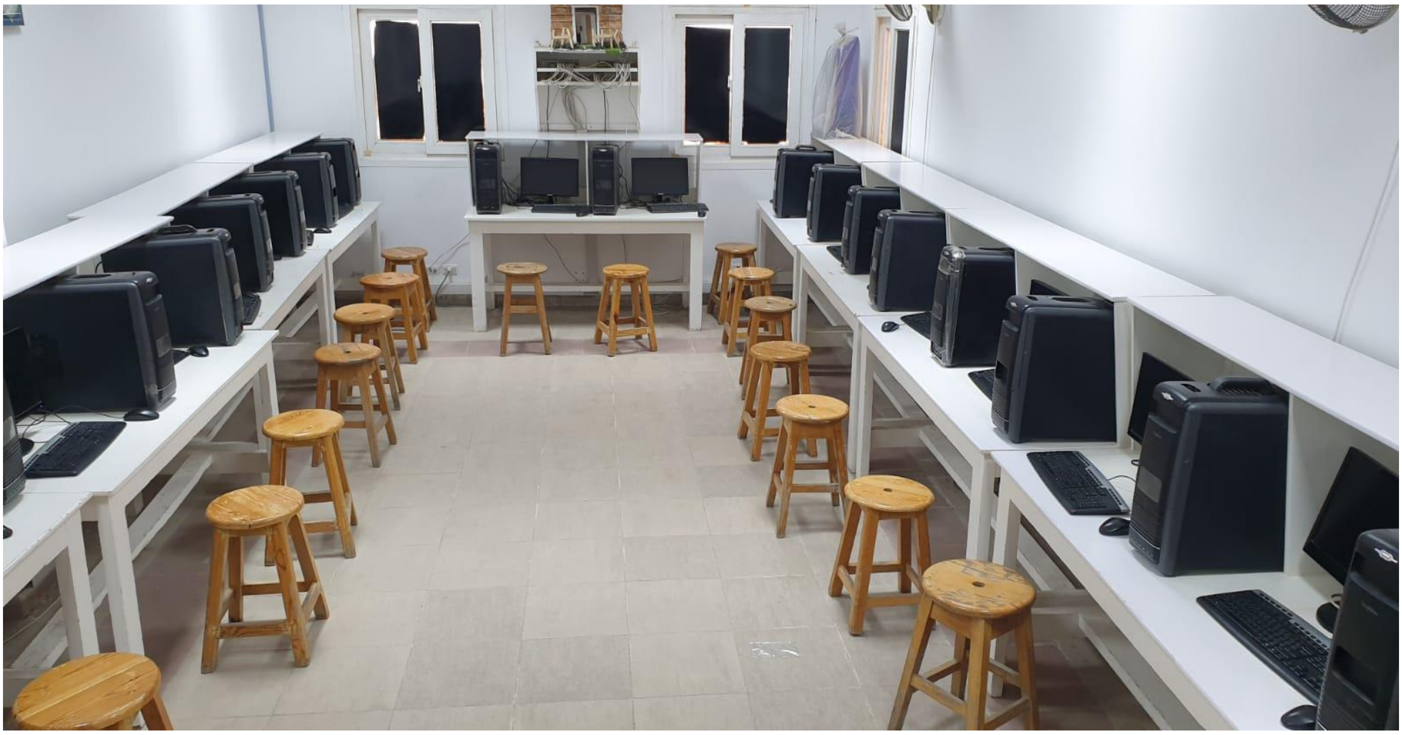
<table>
<tr><th>List of experiments performed in the laboratory and the name of the course serving the experiment</th><th>List of available equipment</th><th>Area in square meters</th><th>Name of the technician in the laboratory/hall</th></tr>
<tr><td>Microprocessor:
1. Assembly programs using simulation SIM8085.
Java (1) and java (2):
1. JAVA App. Using NET BEANS.
2. Programs using JAVA.
Compilers:
1. Lexcial and syntax methods for compiler using C++, Java.
Training Project (5):
1. HTML and CSS.
Data Structure:
1. Array representation.
2. Stack representation.
3. Queue representation.
4. Linked list representation.
5. Sorting representation.
6. Searching representation.
7. Binary tree representation.
8. Graph representation.
VLSI:
1. Logic gates design.
2. Multiplexer, Decoder, Encoder design.
3. Parallel Multiplier design.
4. Sequence detector design.
5. Traffic light controller design.
6. Electronic door lock design.
7. Vending Machine Design.
8. LCD interface design.
Analog Control:
1. Introduction to Matlab
2. System Modeling by Matlab
3. Time Response Analysis of Control System
4. Root Locus for Control System
Software Engineering:</td><td>1. (18) Computer (core i5, RAM 4G)
2. (6) Internet TCP/IP protocol training system
3. HUBOX
4. Switch 16 port
5. Switch 24 port
6. Printer 1320 hp
7. (3) PC Core i5</td><td>50 m^2</td><td>Nivien Kandel (211 C)</td></tr>
</table>

1. developing a software project by using various software engineering principles and methods in each of the phases of software development			
Digital Control: 1. Familiarization of digital control systems toolbox 2. Determination of Z-transform and inverse Z-transform 3. Step response of a discrete-time control system 4. response of a discrete-time control system due to variation in controller parameters 5. PLC Experiments **Automatic Control:** 1. Introduction (Components of Classic control) 2. EKTS (Simulation software) 3. motor control ➢ Start – stop to motor. ➢ Reverse direction for motor. ➢ Ways to start induction motor such as: star/delta 3 phase induction motor. 4. Control application using timer and sensor. 5. Industrial application (color mixer). 6. Industrial application (elevator). 7. Introduction to MATLAB 8. System modeling by MATLAB 9. Time-response analysis of control system. 10. Root locus for control system. 11. Time-response design. Control system stability.			

8-Electronic circuit design Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
VLSI: 1. Logic gates design. 2. Multiplexer, Decoder, Encoder design. 3. Parallel Multiplier design. 4. Sequence detector design. 5. Traffic light controller design. 6. Electronic door lock design. 7. Vending Machine Design. 8. LCD interface design. **Database:** 1. Database design using E/R and EER model. 2. Database design using normalization. 3. Database integrity, security, and recovery. **Operating System:** 1. First come first serve. 2. Shortest Job First. 3. Priority. 4. Round robin. 5. ubuntu 16. **Computer Graphics:** 1. Point, Line, Line Strip, Line Loop. 2. Triangle, Colored Triangle, Triangle Strip, Triangle Fan. 3. Quads, Quad strip. 4. Sin Function. 5. Circle. 6. Polygon by two different way. 7. Transformation 2D (Translate, Scaling, Rotation, Shearing,	1- (20) Computer (Core i5, RAM 4G) 2- MT - 1308 Cable distributor unit 3- (4) FPGA1 Educational Board UP3 Altera cyclone (LCD+CABLE DATA+CD) 4- Suerpro 280 u Programmer – xeltex 5- (5) Spartan – 3E (STARTER board) 6- SERIAL EE P Rom – Epc 7- Module Digital Camera 5MP (D5M) 8- Module 4.3" LCD Touch Panel (LTM) 9- Came Player MP4 Portable Multi-Media Player 10- FPGA Development Kit- UP2 11- (2) Flex – 10k20 RC 240-3 12- (4) Flex 10 k development. board with altera flex 10 k 10 c 84-4 13- Ep- rom programmer- EDW 2500 14- (2) Cyclone II Starter Kit (DE1) 15- (2) Altera data – altbra -cabl 16- Programmer jdm ic	45m^2	Yahia Kotb (206 C)

Reflection and Composite Matrix). 8. 3D Object (Triangle). 9. Projection. 10. Texture Mapping. 11. Rotation an object using Keyboard Function. 12. Drawing an object using Mouse Function. 13. Translate an object using Special Key Function. 14. move an object using Mouse Function and Motion Function. 15. Rendering a lit Sphere using Lighting.			
Data mining:			
1. Many Algorithms for classification using Java and clustering.			
Java (1) and java (2):			
1. JAVA App. Using NET BEANS. 2. Programs using JAVA.			
Microprocessor:			
1. Assembly programs using simulation SIM8085.			



Communication and Computer Engineering Department Building (C) Internal 573

9- Microwaves and Antennas Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Electromagnetic waves (1): 1- Measurement of frequency and wavelength. 2- Measurement of voltage standing wave ratio. 3- Diode detector law. 4- Measurement of load impedance. 5- Power transmission measurement using reflectometer. 6- Power network analysis using VNA. **Electromagnetic waves (2):** Using CST software design: 1- Wave guide. 2- Filter. 3- Branch line coupler. **Antenna:** 1- Radiation pattern of horn antenna. 2- Radiation pattern measurement. 3- Point by point radiation pattern measurement. 4- Directivity measurements. 5- Gain Measurement. 6- Antenna Efficiency Measurement. 7- VSWR and reflection coefficient. 8- Antenna matching using VNA.	1- Equipment "Standard antenna" the equipment consists 2- UHF receiver 433,92MHZ 3- UHF Transmitter 433,92MHZ 4- Folded dipole with baiun-1511847 5- Slot Antenna 6- Yagi-Uda Antenna 10 elements- 1511851 7- Two – Element Antenna – 1511848 8- Full – wave dipole with symmetry element (434 MHZ)- 1511849 9- Yagi – Uda Antenna 6 elements – 1511850 10- (2) 1511856 Adapter N(m) / BNC (f) from Nplug to BNC socket 11- 1511857 Antenna base for Transmitting Antenna 12- 1511859 antenna base with drive for receiving antenna 13- 55122321 interfase connecting lead RS 232 -2M- 9-pole Sub – D socket 9 –pole Sub – D plug 14- 5515014 Measuring cable BNC/BNC 100 cm (58) 15- 5515015 BNC/BNC measuring cable 500 cm (58) 16- 5515015 BNC/BNC measuring cable 500 cm (58) 17- Agilent Model 423B 18- Agilent Model 8648B 19- Agilent Model E4411B OPT. 1DN 20- Agilent Model E4411B 21- Detector PE 8004 22- Direction coupler Modul 4015 C-10 – 7-124 A B (narda) 23- Direction coupler PE 2210-10 (pasternack) 24- ED- 3200 Antenna Trainer 25- GUN OSCILLATTOR 26- GUN POWER SUPPLY	60 m^2	Mustafa Abo-Eliif (207 C)

9- VSWR and Reflection Coefficient Measurement (Antenna Matching) 10- Antenna Matching using the Vector Network Analyzer (VNA)	27- GW Model GSG – 120 FM/AM Signal generator 28- Micro Wave MWT530 29- Microwave Crystal Diode (1N23B) for use with:Microwave Trainer 30- Microwave diode detector feedback Model NO/ 56-200M 31- Microwave test bench MT 9004 scientech(India) 32- Multimeter prope 32- (6) SMA ASSY 1 M 12GHZ 33- Spectrum analyazer HM 5010 34- SWR – 3002ED – laboratory 35- TG1040 1GHZ synthesized RF signal generator 36- Tunable Probe 37- Micro wave Trainer 38- M3860Digital voltammeter 39- (6) Adaptor SMA/M – BNC /F 40- B Ncm-nfe Adapt- Bnc(m) – (FE) 41- BATTERY 42- (2) BNC / Bncadaptor 43- (2) B.N.C (M) RG 58 crimp + Ethernt thin wire 44- (2) BNC Attenuator DB- J01006A0834 45- (2) BNC TADAPTOR 46- Horn Antenna 47- Vector Network Analyzer 48- (3) Computers (core i5, RAM 4G)		

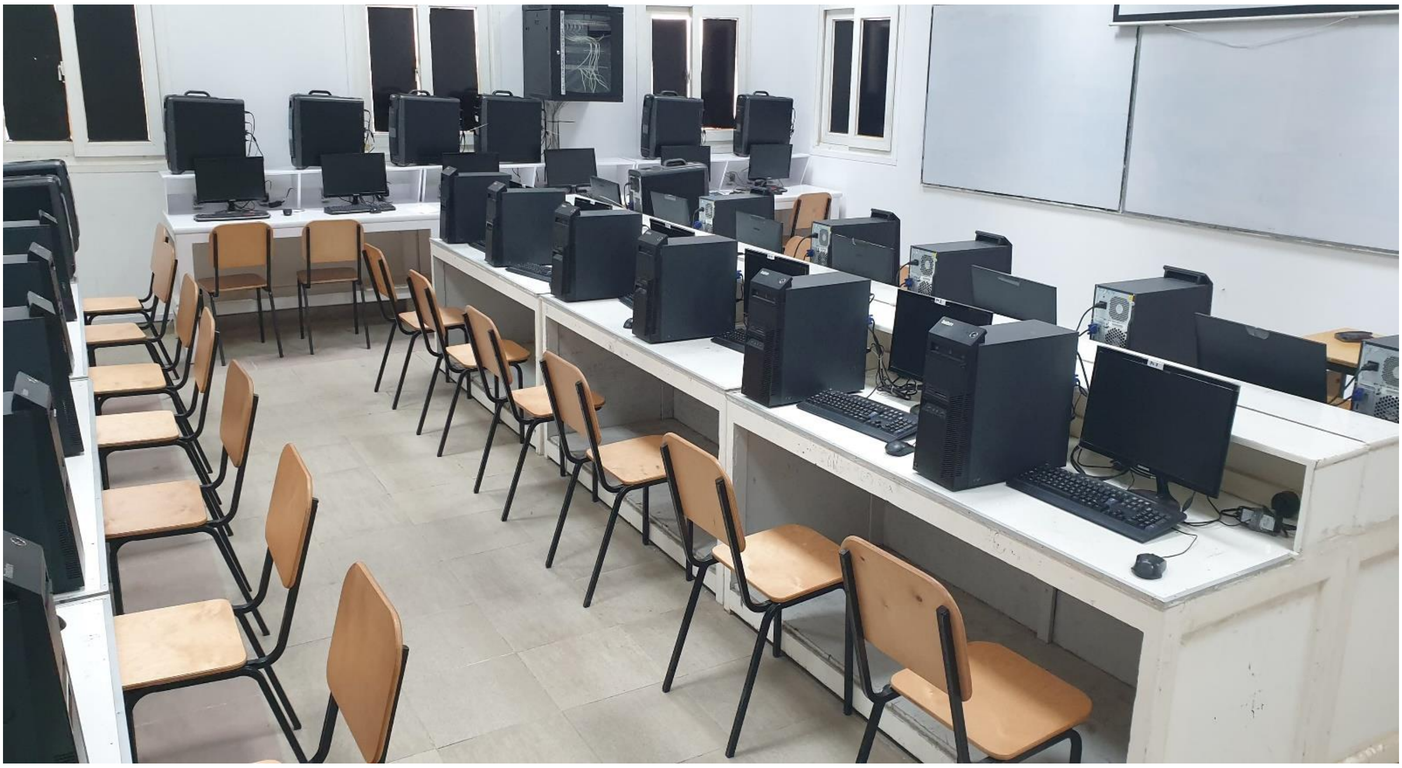
10-Computers Engineering Lab.

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Microprocessor:	1. (20) Computer (core i5, RAM 4G) 2. Switch 24 port 3. Printer 1320 hp 4. (9) PC Core i5	60 m^2	Mustafa Abo-eliif (204 C)
1. Assembly programs using simulation SIM8085.			
Java (1) and java (2):			
1. JAVA App. Using NET BEANS. 2. Programs using JAVA.			
Database:			
1. Database design using E/R and EER model. 2. Database design using normalization. 3. Database integrity, security, and recovery.			
Operating System:			
1. First come first serve. 2. Shortest Job First. 3. Priority. 4. Round robin. 5. ubuntu 16.			
Image Processing:			
1. Image transformation (Rotation – resizing- flipping – cropping). 2. histogram (histogram equalization – masking). 3. Smoothing and blurring (average- gaussian -median filter). 4. Threshold. 5. Edge detection. 6. Contour.			
Compilers:			
Lexcial and syntax methods for compiler using C++, Java.			
Data mining:			

Many Algorithms for classification using Java and clustering.			
Electromagnetic waves (2):			
Computer Simulation Technology CST).			
Computer Drawing Applications:			
1. Point, Line, Line Strip, Line Loop. 2. Triangle, Colored Triangle, Triangle Strip, Triangle Fan. 3. Quads, Quad strip. 4. Sin Function. 5. Circle. 6. Polygon by two different way. 7. Transformation 2D (Translate, Scaling, Rotation, Shearing, Reflection and Composite Matrix). 8. 3D Object (Triangle). 9. Projection. 10. Texture Mapping. 11. Rotation an object using Keyboard Function. 12. Drawing an object using Mouse Function. 13. Translate an object using Special Key Function. 14. move an object using Mouse Function and Motion Function. 15. Rendering a lit Sphere using Lighting.			(Continued) Mustafa Abo-Eliif (204 C)
Data Structure:			
1. Array representation. 2. Stack representation. 3. Queue representation. 4. Linked list representation 5. Sorting representation. 6. Searching representation. 7. Binary tree representation. 8. Graph representation.			
VLSI:			
1. Logic gates design. 2. Multiplexer, Decoder, Encoder design. 3. Parallel Multiplier design.			

4. Sequence detector design. 5. Traffic light controller design. 6. Electronic door lock design. 7. Vending Machine Design. 8. LCD interface design.			
Digital Control:			
1. Familiarization of digital control systems toolbox 2. Determination of Z-transform and inverse Z-transform 3. Step response of a discrete-time control system 4. response of a discrete-time control system due to variation in controller parameters 5. PLC Experiments			
Automatic Control:			
1. Introduction (Components of Classic control) 2. EKTS (Simulation software) 3. motor control ➢ Start – stop to motor. ➢ Reverse direction for motor. ➢ Ways to start induction motor such as: star/delta 3 phase induction motor. 4. Control application using timer and sensor. 5. Industrial application (color mixer). 6. Industrial application (elevator). 7. Introduction to MATLAB 8. System modeling by MATLAB 9. Time-response analysis of control system. 10. Root locus for control system. 11. Time-response design. 12. Control system stability.			
Computer Architecture (1):			
1. Assembly programs using Marie			

Computer Architecture (2):			
1. Solving problems related to cash memory mapping 2. Solving problems related to paging techinque and virtual memory 3. Solving problems related to speeding up computer stystems 4. Solving problems related to Input/Output systems 5. Solving problems related to System Software 6. Solving problems related to Alternative architectures 7. Solving problems related to Performance Measurement and Analysis			



11- Lab and Workshop of Projects

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Printed electronic circuit For projects for all levels	1- (12) OSCILLSCOPE 2- (3) Analoge Digital Lab ST 2613 3- (8) ANALOG DIGITAL AT-700 4- (8) DIGITAL MULTIMETER GDM-451 5- (3) DIGITAL MULTIMETER6165 6- (14) Function Generator 7- (5) GDS 806 S- 60MHZ 8- LCR Meter –MODEL BK – 878 9- (5) Digital Board M21-5000 10- (11) Training Board AT 700 11- (15) Bread board ct-60 12- Avometer 13- (2) Digital Oscilloscope PE DS0-3102 14- Function generator – 4501 15- Avometer – MT 2007 16- Inca Set 17- Blacksmith hammer 18- Iron filing 19- Blacksmith saw 20- (25) Caustic holder 21- (15) Wire stripper 22- (30) Soldering iron 23- (5) Wax pistol 24- (16) Clipper 25- Drill 26- (25) Screwdrivers 27- Sickle	50 m^2	Mahamed EL-Gohry (304 C)

12-Printed circuit Lab

List of experiments performed in the laboratory and the name of the course serving the experiment	List of available equipment	Area in square meters	Name of the technician in the laboratory/hall
Printed electronic circuit For projects for all levels	1- Projector printer format red lights 2- Double-sided printing projector lamps 3- Avometer 4- two comb experiment board 5- (7) Tin straw 6- Soldering iron 7- (2) Scraps 8- (2) Shanior 9- Pliers 10- Drill 11- (6) Screwdrivers 12- Sickle 13- Arket saw 14- Italian dryer 15- Air blower 16- (2) Iron	15 m^2	Mahamed EL-Gohry (101C)