

2. リアド技術短期大学電子工学科カリキュラム

Contents of Curricula (College of Riyadh [1997])

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- ⑨ Network operating system
- ⑩ Introduction to system analysis and design
- ⑪ Introduction to UNIX

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- ① Introduction to communication system
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- ⑦ Introduction to optical communications
- ⑧ Data communications & networks

The College of Technology in Riyadh
Electronic Technology Department

1997

CONTENTS

PART I: POWER ELECTRONICS FUNDAMENTALS

1. Diode and Thyristor in DC Circuits
2. Thyristor in AC circuit
3. Thyristor in AC Circuit with Resistive and Inductive Loads
4. Thyristor in Antiparallel (Inverse) Connections Triac in AC Circuit
5. Two-Pulse-Bridge Connection, Uncontrolled
6. One-Pole Controlled Two-Pulse Bridge Connection
7. Branch-Pair Half-wave Two-Pulse Bridge Connection
8. Two Pulse Bridge Connection with Resistive And Inductive Load

PART II: POWER ELECTRONICS APPLICATIONS ON DC MOTORS

1. Simple Methods of Controlling A DC Motor
2. Current, Torque, and Speed Regulation
3. Thyristor Control of A DC Motor
4. Open-And-Closed-Loop Control
5. Speed Control Using Armature Feedback

REFERENCES

BACHELOR OF ENGINEERING TECHNOLOGY IN ELECTRONICS INDUSTRIAL ELECTRONICS AND CONTROL DIVISION

Course: Digital Systems Design Lectures: 2 Lab: 2 Study Units: 3

Objectives:

The objective of this course is to teach the student basics of Programmable Logic Devices (PLD) technology and the design of digital systems using PLD's as opposed to traditional methods of logic design.

Contents:

1. Introduction to PLD's
2. Programmable Read Only Memory (PROM)
3. Combinational Logic Design using PROM's
4. Sequential Logic Design Using PROM
5. Field Programmable Combimational Logic Devices
6. Field Programmable Logic Sequencers
7. Programmable Array Logic
8. Erasable Programmable Logic Devices

References:

1. P.K. Lala, Digital System Design Using Programmable Logic Design, Prentice Hall
2. D. Pellerin and M. Holley, Digital Design Using ABEL, Prentice Hall, 1994
3. J.F Wakerly, Digital Design Principles and Practices, Prentice Hall, 1990

- Digital Designing with Programmable Logic Devices
John W. Carter, Prentice Hall, 1997

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THE DEPARTMENT OBJECTIVES

Due to the fast pace of development that is witnessed in the Kingdom in the recent years, there has been a considerable need for highly qualified graduates at the intermediate level. The associate degree program in Electronic Technology which is being developed at the Riyadh college of Technology intends to fill this gap specifically. Its goal is to form “Assistant Engineers”, in the areas of Industrial Electronics & Control, Communications, and Computer Technology who will be a link between the engineers on one side and the technicians on the other side.

The department aims at providing the students with:

- Technical skills and hand on experimentation on typical equipments which are encountered in the practical life so that they can carry out implementation, operation, maintenance and repair tasks of highly sophisticated modern electronic equipments.
- A good understanding of basic concepts in his area of specialization and the ability to analyze cause effect relationship and determine origins of malfunctions and decide on the appropriate repair tasks.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Basic Workshop **2 St. Unit : 0 Theory + 4 Practical**

Objectives:

The objectives of the syllabus are to enable students to:

1. build their basic technical skills: mechanical and electrical.
2. identify, use, and inspect the basic electric components.
3. use different analog and digital measuring instruments.
4. use Test board in testing electronic circuits.
5. how to use data book.

Contents :

Workshop Safety Regulation.

Basic Mechanical Skills.

Instrumentation: multimeters, oscilloscope, frequency generator, printer, etc..

Inspecting Resistors, Capacitors, Inductors, Diodes, and Fuses.

Using Test Board to test Simple Circuits

Assembly and Soldering.

Classic Fabrication and Metal Finishing Techniques.

Rectifier Circuits Assembling and Troubleshooting.

References:

- 1 Class Notes.
2. R. S. Villanucci, A. W. Avgis , and W. F. Megow, **Electronic Techniques Shop Practice and Construction**, Prentice-Hall, Inc. 1996.
3. R. A. Reis, **Electronic Project Design And Fabrication**, Merrill Publishing Company, 1989.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Calculus **3 St. Unit : 2 Theory + 2 Exercise**

Objectives:

The objectives of the syllabus are to enable student to :

1. understand the fundamentals and applications of differentiation and integration that could be used in computational techniques.
2. solve differential equations that help him to understand the behavior of physical systems.
3. prepare for engineering mathematics.

Contents:

Limit and Continuity.
Differentiation and Application of Derivatives.
Integral and Application of Integrals.
Techniques of Integration.
Taylor's Formula.
Applications.

References:

1. G. L. Bradely and K. J. Smith, **Calculus**, Prentice-Hall, Inc., 1995.
2. Edwards & Penney, **Calculus and Analytic Geometry**, Prentice-Hall, Inc., latest edition.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Introduction to Computer & Applications 3St. Unit :1 Theory + 4 Practical

Objectives :

The objectives of the syllabus are to enable students to:

1. get familiar with the computer and its terminology.
2. use DOS and Windows.
3. how to edit computer files.

Contents :

Introduction to computer systems.
DOS.
Windows.
Editing Files.
Wordprocessor.
Spreadsheet.

References:

N.Stern and R.Stern, **Computing in The Information Age** ,John Wiley,1996.

ELECTRONIC TECHNOLOGY DEPARTMENT

COMMON COURSES

Electrical Engineering Fundamentals 3 St. Unit : 2 Theory + 2 Exercises

Objectives:

- The objectives of the syllabus are to enable students to:
1. understand electricity, magnetism and the relationship between them.
 2. explain the relationship between voltage, current, and resistance.
 3. use multimeter to measure voltage, current and resistance.
 4. solve basic electric circuits involving voltage, current, and resistance using different appropriate techniques.
 5. know the basic ideas of inductors, capacitors, and AC circuits.
 6. understand the charging and discharging a capacitor using exponential curve

Contents :

Material Compositions.
Electricity and Electrostatics.
Voltage, Current, and Resistance.
Magnetism and Relay.
Meters, Multimeters, Measuring Voltage, Current, and Resistance.
Ohm's Law and Power.
Resistance combinations.
Voltage Dividers.
Kirchoff's Voltage and Current Laws.
Bridge Circuits.
Thevenin's Theorems.
Inductors and Capacitors.
Charging and Discharging a capacitor.
Introduction to AC circuits.

References:

1. Thomas L. Floyd, **Electric Circuit Fundamentals**, Prentice Hall, Inc., third edition, 1995.
2. CR. Paul: SEA. Nasal: and LEE. Unnewehr , **Introduction to Electrical Engineering**, McGraw-Hill, 1992
3. P. Z. Peebles and T. A. Giurma, **Electrical Engineering**, McGraw-Hill, 1991
4. DC circuits/Nida Lab Text Manual.
5. Paul B. Zbar and Joseph Sloop, **Electricity-Electronics Fundamentals, A TEXT-LAB MANUAL**, Macmillan/McGraw-Hill Science Publishing Company, fourth edition, 1993.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMON COURSES

Electronics I 3 St. Unit : 2 Theory + 2 Practical

Objectives :

The objectives of the syllabus are to enable the students to :

1. understand the principle of semiconductor currents.
2. be familiar with the characteristics and the data sheet of diodes, transistors (BJT, FET, UJT).
3. analyze, construct and test some simple electronic circuits using diodes and transistors.

Contents :

Atomic structure for conductors, insulators, and semiconductors .
PN-Junction : forward and conduction.
Diode Applications : clippers and clampers.
Zener Diode : characteristics and regulation.
Transistor biasing circuits .
Basic transistor amplifiers and switches.
The operation of other devices as UJT.

References :

1. Thomas L. Floyd, "Electronic Devices", Prentice Hall, Inc., fourth edition, 1996.
2. Boylestad/Nashelsky, **Electronic Devices and Circuit Theory**, Prentice-Hall latest edition.
3. **Analog Circuits** , Nida Lab. Manual Text .
4. Thomas L. Floyd, **Electronic Devices** , Prentice -Hall , 1996.
5. P.B.Zbar, **Industrial Electronics:A Text-Lab. Manual**, MCGraw-Hill, Inc., latest edition .

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

| | | |
|----------------------|------------------|---|
| Electronics I | 3 credits | 2 hrs lectures 2 hrs lab |
|----------------------|------------------|---|

detailed contents:

1. atoms-covalent bonds-conduction in semiconductor
2. N-type & p-type
3. PN junction
4. biasing PN junction.
5. rectifier diodes
6. half-wave rectifiers
7. full-wave rectifiers.
8. RC & RL filters (final equations,comparison, how they work)
9. diode limiting & clamping circuits
10. voltage multipliers/ diode data sheet
11. zener diodes.
12. zener diode applications/ optical diodes.
13. Test # 1
14. transistor construction/ operation/types.
15. transistor parameters & ratings
16. transistor as voltage amplifier & switch
17. DC operating point
18. base bias and emitter bias
19. voltage divider bias
20. collector-feedback bias
21. Test # 2
22. JFET
23. JFET charact. & parameters
24. JFET biasing
25. MOSFET
26. MOSFET charact. & parameters.
27. MOSFET biasing.
28. UJT
29. UJT relaxation oscillator
30. TEST # 3

Textbook: Thomas L. Floyd, " **ELECTRONIC DEVICES** ", prentice hall, Inc., fourth edition, 1996.

Used chapters(in order) :

ch.1,ch.2,3-1,3-2,3-4,4-1,4-2,4-3,4-4,4-5,5-1,5-2,5-3,5-4,5-5,ch.7,11-6

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Electronics I laboratory 2 hrs lab

EXPERIMENT S' OUTLINES

1. SEMICONDUCTOR DIODE: junction diode characteristics - testing
2. DIODE CIRCUITS: limiters - clambers
3. HALF/FULL-WAVE RECTIFIERS
4. VOLTAGE MULTIPLIERS.
5. ZENER DIODE CHARACTERISTICS
6. ZENER REGULATORS
7. JUNCTION TRANSISTORS: familiarization - testing - biasing - characteristics.
8. TRANSISTOR BIAS STABILIZATION
9. COMMON-EMITTER AMPLIFIER
10. EMITTER-FOLLOWER AMPLIFIER: characteristics
11. FET CHARACTERISTICS
12. FET COMMON-SOURCE AMPLIFIER
13. UJT CHARACTERISTICS
14. UJT RELAXATION OSCILLATOR

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Electronics II **3 St. Unit : 2 Theory + 2 Practical**

Objectives :

The objectives of the syllabus are to enable students to :

1. design and analyze filters.
2. understand and analyze electronic circuits involving diodes and transistors.
3. use operational amplifiers in different applications.
4. be familiar with some simple ICs such as 555.

Contents :

Filters.
Power Supplies
Transistor cascade/output Amplifiers.
Transistor oscillator.
Transistor Pulse Circuits.
Operational Amplifier Circuits.
555 Timer.

References:

1. Boylestad/Nashelsky, **Electronic Devices and Circuit Theory**, Prentice-Hall, latest edition.
2. Abraham Palace , **Electronic Devices and Circuit Analysis**, Demmar Publisher, latest
3. Analog Circuits/**Nida** Lab Manual Text.
4. Thomas L. Floyd, **Electronic Devices** , Prentice -Hall, 1996.

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Electronics II

3 credits

2 hrs lectures

2 hrs lab

detailed contents:

1. transistor review
2. transistor ac equivalent circuit
3. common-emitter amplifiers
4. common-collector amplifier.
5. class B push-pull amplifier
6. small-signal FET amplifier operation
7. FET amplification
8. common-source amplifier.
9. Test # 1
10. the differential amplifier
11. op-amp data sheet parameter
12. op-amp configuration with -ve feedback
13. op-amp open-loop response
14. op-amp closed -loop response
15. comparators
16. summing amplifiers
17. the integrator & differentiator.
18. the instrumentation amplifier
19. Test # 2
20. basic filters (response- characteristics)
21. active low- & high- pass filters
22. active band pass filters
23. oscillator (definition-principles)
24. oscillator with RC feedback
25. oscillator with LC feedback
26. the 555 as an oscillator
27. the 555 as an oscillator
28. voltage regulation & IC voltage regulators
29. applications of IC voltage regulators
30. Test # 3

Textbook: Thomas L. Floyed, " **ELECTRONIC DEVICES** ", prentice hall, Inc., fourth edition, 1996.

Used chapters(in order) :

ch.5,6-1,6-2,6-3,6-4,9-2,12-1,12-2,12-3,12-4,12-5,13-1,13-2,13-3,14-1,14-2,14-3,
14-4,16-1,16-2,16-3,16-4,16-5,15-1,15-2,15-3,15-4,15-6,17-1,17-5,17-6

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Electronics II laboratory

2 hrs lab

EXPERIMENT S' OUTLINES

1. SINGLE-STAGE AMPLIFIER (*) + *Emitter Follower*
2. CASCADE AMPLIFIERS
3. SINGLE-STAGE FET AMPLIFIER (*)
4. PUSH-PULL AMPLIFIER (**)
5. FEEDBACK AMPLIFIER
6. DIFFERENTIAL AMPLIFIER
7. BAYS-JHON OSCILLATOR ? (*Base Tuned Oscillator*)
8. RC-PHASE SHIFT OSCILLATOR
9. OP- AMP : DC CHARACTERISTICS
10. OP-AMP : AC CHARACTERISTICS
11. OP-AMP CIRCUITS: COMPACTORS-VOLTAGE FOLLOWER/RECTIFIER(*)
12. OP AMP CIRCUITS : DIFFERENTIATOR - INTEGRATOR (*)
13. 555- TIMER/ASTABLE (*)
14. 555-TIMER /APPLICATION

* It is better to build this experiment using breadboard

** need distortion meter/audio analyzer

ELECTRONIC TECHNOLOGY DEPARTMENT COMMON COURSES

Electronic Workshop 2 St. Unit : 0 Theory + 4 Practical

Objectives :

The objectives of the syllabus are to enable students to:

1. identify, use, inspect many electronic devices and common ICs.
2. using oscilloscope in various applications.
3. draw and simulate electronic circuits using common software.
4. develop the experience in project building and documentation.
5. use data book to find the required electronic devices and their equivalence.

Contents :

Measuring phase difference using oscilloscope.
Transformers.
Transistors(BJT, UJT, FET).
Voltage Regulators (74 xx), op amp 741 and 555.
Schematic Diagrams.
Wiring Diagram.
Electronic Circuits Simulation.
Filters and Oscillators.
Implementing Printed Circuit Boards with CAD Techniques.
Soldering Using New Techniques.
Building a Variable Power Supply.

References :

1. Class Notes.
2. R. S. Villanucci, A. W. Avgis , and W. F. Megow,**Electronic Techniques Shop Practice and Construction**, Prentice-Hall,Inc. 1996.
3. R. A. Reis, **Electronic Project Design And Fabrication**, Merill Publishing Company,1989.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Electrical Engineering Laboratory 1 St. Unit: 2 Practical

Objectives :

The objectives of the syllabus are to enable students to:

- 1- Familiarize the student with basic measurement instruments .
- 2- Understand the relationship between voltage , current , and resistance.
- 3- Verify the relationship between voltage and current series (and /or) parallel DC circuits.
- 4- Learn the behavior of RL and RC circuits in DC mode .
- 5- Introduce the basic futures AC circuits .

Contents :

Familiarization with Lab. equipment.
Voltage current and resistor measurement.
Ohm's law & power dissipation .
Voltage divider .
Current divider .
Bridge circuits .
Theveinin theorem.
Oscilloscope and function generator & frequency counters.
RC circuits transient .
RL circuits transient .
Basic AC waveform measurement.
PC experiments.

References :

- 1- Nida Lab. Text Manual.
- 2- Delmar, **PC Lab. Experiment: DC & AC Circuits**, G. McMillan, 1992

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

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| Electrical Engineering laboratory | 1 credit | 2 hrs lab |
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EXPERIMENT S' OUTLINES

1. USING THE MULTIMETER: electronic voltmeter familiarization - measuring resistance- voltage- current
2. CONTROL OF DIRECT CURRENT: (by changing the resistance / by changing the voltage).
3. OHM'S LAW : fundamental - application to series circuits.
4. SERIES CIRCUIT AND VOLTAGE DIVIDERS.
5. PARALLEL CIRCUIT AND CURRENT DIVIDERS
6. SERIES-PARALLEL CIRCUITS: equivalent resistance - voltage across every element and every branch.
7. KIRCHOFF'S LAW: KVL - KCL.
8. BRIDGE CIRCUITS: measuring unknown resistance using wheatson bridge.
9. THEVENIN'S THEOREM.
10. POWER: measurement - transfer - max. power.
11. ELECTRICITY AND MAGNETISM: magnetic field produced by current in a conductor - magnetic induction.
12. AC MEASUREMENT : measuring ac with oscilloscope - amplitude-frequency - period - peak to peak .
13. RC CHARGING AND DISCHARGING CIRCUITS: RC -time const.
14. PHASE RELATIONS IN INDUCTORS AND CAPACITORS.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Logic Circuits I **2 St. unit : 2 Theory**

Objectives :

The course gives an introduction to different number systems, basic logic gates and a survey of the fundamentals of Boolean algebra whereby different combinational logic circuits are discussed and implemented.

Contents :

Number systems and codes .
Basic logic gates.
Boolean algebra.
Combinational logic circuits.
Logic circuit families.

References:

- 1-Floyd, T.L., **Digital Fundamentals**
2. Morris Mano, **Digital Design** , Prentice -Hall, 1991.

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

| | | |
|------------------|-----------|-----------------------------|
| Logic Circuits I | 2 credits | 2 hrs lectures 0 hrs lab |
|------------------|-----------|-----------------------------|

detailed contents:

1. Introductory digital concepts - digital and analog quantities.
2. Number systems :decimal numbers & binary numbers
3. Conversion from binary to decimal - conversion from decimal to binary
4. Binary arithmetic.
5. 1's and 2's complements of binary numbers.
6. Hexadecimal numbers.
7. Octal numbers.
8. Basic logic gates: the AND gate, the OR gate, and the NOT gate
9. The NAND and NOR gates
10. Exclusive OR - Exclusive NOR.
11. Test 1
12. Boolean algebra
13. DeMorgan's theorems
14. Simplification using Boolean expressions
15. The Karnaugh Map
16. Karnaugh Map SOP and POS minimization
17. Implementing Combinational Logic Circuits
18. Combinational logic using NAND and NOR gates
19. Decoders
20. Encoders
21. Code Converters
22. Test 2
23. Multiplexers
24. Demultiplexers
25. Basic adders- Half adder and Full adder
26. Parallel binary adders
27. 2's complement representation of signed numbers
28. Binary adder subtractor
29. Logic families
30. Test 3

Textbook: Thomas L. Floyd, " **DIGITAL FUNDAMENTALS**", Prentice Hall, Inc., sixth edition, 1997.

Used sections :

1-1, 1-2, 2-1, 2-2, 2-3, 2-4, 2-5, 2-8, 2-9, 2-10, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 4-1, 4-2, 4-3, 4-5, 4-8, 4-9, 4-10, 5-2, 5-4, 6-1, 6-2, 6-5, 6-6, 6-8, 6-9

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Logic Circuits II 3 St. Unit: 2 Theory + 2 Practical

Objectives :

The course covers the properties and applications of the standard microcomputer IC -components such as Flip-Flops, counters , shift registers , memories and arithmetic logic units .

Contents :

Basic Flip-Flops
Counters
Shift registers
Memories
Arithmetic logic units

References :

1-Tokheim, **Digital Electronics.**

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Logic Circuits II

3 credits

2 hrs lectures

2 hrs lab

detailed contents:

1. SR- Flip Flop(FF)
2. Clocked SR- FF
3. JK- FF
4. JK- master/slave FF
5. D-type and T-type Flip Flops
6. Counters
7. Asynchronous counters
8. Synchronous counters
9. Up/Down synchronous counters
10. Design of synchronous counters
11. Presettable counters
12. Counter applications
13. Test 1
14. Shift registers
15. Serial in / serial out and serial in / parallel out shift registers
16. Parallel in / serial out and parallel in / parallel out shift registers
17. Bidirectional shift registers
18. Shift register applications
19. Basics of semiconductor memories.
20. Read only memories (ROMs).
21. ROMs as code converters.
22. Test 2
23. programmable ROMs (PROMs and EPROMs)
24. Read /write random - access memories (RAMs)
25. Integrated circuit Technologies.
26. TTL circuits.
27. CMOS circuits.
28. Comparison of CMOS and TTL characteristics.
29. Interfacing logic families.
30. Test 3

Textbook: Thomas L. Floyed, " **DIGITAL FUNDAMENTALS** ", Prentice Hall, Inc., sixth edition, 1997.

Used sections(in order) :

8-1, 8-2, 8-3, 9-1, 9-2, 9-3, 9-4, 9-7, 10-1, 10-2, 10-3, 10-4, 10-5, 10-8, 12-1, 12-2, 12-3, 12-4, 15-1, 15-2, 15-4, 15-5, 15-6

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

| | | |
|--------------------------|-------------------|------------------|
| Logic Circuits II | laboratory | 2 hrs lab |
|--------------------------|-------------------|------------------|

EXPERIMENTS' OUTLINES

1. LOGICAL TRAINER FAMILIARIZATION: AND/ OR/ NOT.
2. NAND/ NOR/ EXCLUSIVE OR/ NOR GATES/ PARITY CIRCUITS.
3. BOOLEAN ALGEBRA.
4. BINARY ADDITION.
5. BINARY SUBTRACTION.
6. MEMORY CIRCUITS: FLIP-FLOP.
7. T- AND D- FLIP-FLOP.
8. J-K FLIP-FLOP.
9. PARALLEL TO SERIAL AND SERIAL TO PARALLEL CONVERSION.
10. SHIFT RIGHT/ LEFT REGISTER.
11. RIPPLE COUNTER.
12. PROGRAMMING A RIPPLE COUNTER.
13. PARALLEL COUNTERS.
14. SELECTED DIGITAL CIRCUIT AS AN APPLICATION.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

MATHEMATICS 3 St. Unit : 2 Theory + 2 Exercise

Objectives :

The objectives of the syllabus are to

1. provide the necessary mathematics for students entering any field of technology.
2. enable students to understand the algebraic equations which are used in many technical courses.
3. provide students with enough mathematical background to start calculus course.

Contents :

Number Sets and Basic Operations.
Polynomials.
Equalities and Inequalities.
Exponents and Logarithm.
Coordinated Geometry.
Trigonometry
Vectors, Matrices and Determinants.
Complex Numbers.
Solving a Set of Linear Equations.

References :

1. L. O. Cannon and J. Eligh, **Precalculus**, Harper Collins College Publishers, 1994.
2. Russell V. Person, **Essentials of Mathematics**, John Wiley & Sons, latest edition.
3. Grob, **Mathematics for Basic Electronics**, 4/e, McGraw-Hill, 1995.
4. Perry, **Elementary Linear Algebra**, McGraw-Hill, 1995.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Microprocessors Fundamentals 3 St. Unit : 2 Theory + 2 Practical

Objectives :

The objectives of the syllabus are to enable students to:

1. understand the basic microcomputer components and the architecture and functioning of the microprocessor.
2. perform programming tasks in assembly language.
3. understand basic interfacing techniques with memory and input/output units

Contents :

Introduction to microcomputer structure and organization.
Bus systems.
Microprocessor (ALU/CU).
Memory Units.
Input/output units.
Fundamentals of programming in assembler.

References :

1. Jhon Uffenbeck, **MICROcomputers and Microprocessors/ The 8080,8085 and Z-80/ Programming, Interfacing and Troubleshooting**,1995.

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Microprocessor Fundamentals

3 credits

2 hrs lectures

2 hrs lab

detailed contents:

1. the basic components of a computer with the help of block diagram
2. the basic function of CPU, memory unit, I/O units.
3. the construction of bus system distinguishing between address bus, data bus, control bus
4. describing the internal structure and the function of ALU and CU in the microprocessor
5. the function of basic registers and counters in a microprocessor
6. introducing the internal structure of intel 8085
7. the function of each flag bit in the status register of the 8085
8. microprocessor programming explaining that a bit combination is interpreted as a command and that to each microprocessor a list of commands belongs
9. instruction cycle (fetch-execution)
10. distinguishing between commands in: binary, hex., assembly codes.
11. Test # 1
12. data transfer instructions of the 8085
13. addressing modes of 8085
14. data transfer functions of 8085
15. assembly programming examples on the data transfer instructions of 8085/ also flow chart
16. arithmetic instruction of 8085
17. arithmetic instructions
18. programming examples using data transfer and arithmetic instructions of 8085
19. Test # 2
20. the jump instructions of 8085
21. programming examples for conditional and unconditional jump instructions
22. logic I/O instructions
23. programming examples using all instructions
24. microprocessor interfacing-triastate gates-bus buffering
25. 8085 bus latching and buffering
26. types of memory: SRAM, DRAM, ROM
27. interfacing memory devices with 8085
28. I/O ports description
29. I/O interfacing-the isolated I/O interfacing- memory mapped I/O
30. Test # 3

Textbook: Jhon Uffenbeck, , " Microcomputers and Microprocessors/The 8080,8085,and Z-80/programming, Interfacing and Troubleshooting ", 1995.

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2020 3/4

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Microprocessor Fundamentals laboratory

2 hrs lab

EXPERIMENT S' OUTLINES

1. INTRODUCTION TO YEAC10 COMPUTER TRAINING.
2. WRITING AND READING OPERATIONS OF YEAC10 COMPUTER TRAINING.
3. THE FETCH AND EXECUTE CYCLES OF INSTRUCTIONS.
4. APPLICATION PROGRAMS FOR YEAC10 COMPUTER TRAINER
5. INTRODUCTION TO THE 8085 EXPERIMENTAL MICROCOMPUTER.
6. TRANSFER INSTRUCTION- PART I.
7. TRANSFER INSTRUCTION- PART II.
8. ARITHMETIC INSTRUCTIONS- PART I.
9. ARITHMETIC INSTRUCTIONS- PART II.
10. APPLICATION PROGRAMS - I.
11. LOGIC INSTRUCTIONS.
12. BRANCH INSTRUCTIONS.
13. REGISTER AND OTHER INSTRUCTIONS.
14. APPLICATION PROGRAMS - II.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Physics I **3 St. Unit : 2 Theory + 2 Practical**

Objectives:

The objectives of the syllabus are to

A- promote an awareness that

1. scientific theories and methods have developed as a result of cooperative activities of groups and individuals.
2. the study and practice of science are subject to technological limitations.

B- develop attitudes relevant to Physics such as

1. concern for accuracy and precision
2. objectivity, integrity, inquiry, initiative, and inventiveness.
3. acquire sufficient understanding and knowledge to the technical materials.

Contents :

Measurements.
Mechanics.
Heat
Light and Sound Waves.
Electricity
Magnetism

References:

1. R. A. Serway, **College Physics**, Serway and Faughn, 1995.
2. A. Bieser, **Concepts of Modern Physics**, McGraw-Hill, Inc., 1995.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Computer Programming 3 St. Unit : 2 Theory + 2 Practical

Objectives :

This is the first course for students intending to major in computer technology, The purpose of this course is to introduce student to some fundamental topics in computer science and to improve programming skills through an introduction to a programming language , And to introduce the students to methods and tools for programming for automated solution to simple problems that require use of simple data structures with emphasis on modern problem solving and algorithm development .

Contents :

Introduction to Programming Languages
Problem Solving and Algorithm Development
Introduction to Elementary Data Types and Related Operations, Expression
Assignment Statement
Input/Output Statement
Operator (Operator Precedence, Relational Operators, Logical Operator)
Built-in Functions
Control Flow
-Conditional Statements
-Iteration Statements
Variable Scope and Modular Programming
-Writing User-defined functions
-Variables Scope
-Passing variable
-Function Return Values and Prototypes

References :

1-Brian N. Kernighan\Dennis M. Ritchie,The C Programming Language
2-Greg Perry, C By Example

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Introduction to Engineering Mathematics 3 St. Unit: 2 Theory + 2 Exercise

Objectives :

The objective of the course is to enable the student to learn :
the differential equations, the Laplace Transforms, and their applications in
electronic systems analysis .

Contents :

Introduction to Differential Equations.
Linear First-Order Differential Equations.
Applications to Electric Circuits.
Linear Higher-Order Differential Equations.
Applications to Electric Circuits.
Laplace Transforms and Applications.
Fourier Series.

References :

Kreyszig, E, **Advanced Engineering Mathematics**, Wiley,

ELECTRONIC TECHNOLOGY DEPARTMENT COMMON COURSES

Electric Circuits **3 St. Unit : 2 Theory + 2 Practical**

Objectives :

The objective of the course is to enable the student to:
to determine AC quantities (voltage, current, impedance, frequency, power, power factor) for different wave forms,
measure AC quantities using multimeters and oscilloscope,
analyze series and parallel AC circuits,
understand the concept of time constant in an RL an RC circuits,
analyze RLC circuits and list the characteristics of a resonance circuit,
understand, analyze, and test basic filters (LPF,HPF,BPF).

Contents :

Generating AC .
Sinusoidal and nonsinusoidal waves .
AC measurements (Amplitude and frequency) .
Series and parallel RL circuits .
Series and parallel RC circuits .
Transients in RC and RL circuits .
Series and Parallel RLC circuits, Resonance .
Filters.

References :

1. Thomas L. Floyed, **Electric Circuit Fundamentals**, Prentice Hall, Inc., third edition, 1995.
2. Dorf, R.C, **Electric Circuits**, Wiley, 1993
3. Boylestad, R.L, **Introductory Circuit Analysis**, Mac Millman, 1990
4. **AC Circuits**, Nida Lab Manual
5. Paul B. Zbar and Joseph Sloop, **Electricity-Electronics Fundamentals, A TEXT-LAB MANUAL**, Macmillan/McGraw-Hill School Publishing Company, fourth edition, 1993.

RIYADH COLLEGE OF TECHNOLOGY
ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES SECTION

Electric Circuits laboratory 2 hrs lab

EXPERIMENT S' OUTLINES

1. FAMILIARIZATION WITH FUNCTION GENERATOR AND FREQUENCY METER: amplitude frequency -period measurements for different waveforms.
2. RC CIRCUIT TRANSIENTS
3. RL CIRCUIT TRANSIENTS
4. CAPACITIVE REACTANCE AND PHASE MEASUREMENTS.
5. INDUCTIVE REACTANCE AND PHASE MEASUREMENTS.
6. SERIES/PARALLEL RL CIRCUIT CHARACTERISTICS.
7. SERIES/PARALLEL RC CIRCUIT CHARACTERISTICS.
8. SERIES RESONANCE.
9. PARALLEL RESONANCE
10. POWER IN AC CIRCUITS
11. HIGH-PASS FILTERS
12. LOW-PASS FILTERS
13. TRANSFORMERS: fundamentals - reflected impedance
14. DIFFERENTIATORS AND INTEGRATORS: using RC / RL circuits.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Chemistry **2 St. Unit : 1 Theory + 2 Practical**

Objectives:

The objectives of the syllabus are to enable students to acquire basic knowledge about many topics related to chemistry and its applications .

Contents :

- Chemistry and Calculations .
- Atoms, Molecules and Ions .
- Chemical Reactions .
- Calculation with Formulae and Chemical Equations .
- Gaseous State .
- Electrochemistry .
- Electronic Configuration and Periodical Table of Elements .
- Types of Bonding .
- Solutions .

Laboratory Projects :

- Calibrations of volumetric glassware's .
- Preparation of aqueous solutions of salts .
- Qualitative analysis of cations and anions in simple aqueous solutions .
- Acid-base titration experiments .

References :

1. Hill and J, Holman, " Chemistry in Context " , Thomas Nelson, 4th edition, Surrey, UK, 1995 .

Textbooks:

1. D. D. Ebbing, " General Chemistry " , Houghton Mifflin Company, 3rd International edition, 1990 .

ELECTRONIC TECHNOLOGY DEPARTMENT
COMMON COURSES

Physics II **2 St. Unit : 1 Theory + 2 Practical**

Objectives:

The objectives of the syllabus are to teach the student:

The concepts used in the study of light

Optoelectronic devices

Contents :

- **The Nature of Light :**

Basic Concepts

- **Light Generation :**

Electron and Photon Interaction

Laser Action

Semiconductor Laser Diodes

Types of Lasers :

a) Gas Lasers

b) Solid State Lasers

- **Light Detection :**

Photoconductive Cells

Photodiodes

Photovoltaic Cells

Phototransistors

Spectral Response

References:

“Transducers Kit, Book3- Detection of Light” , Feedback Documentation .

Optoelectronics, Endel Uiga, Prentice Hall / Macmillan 1996 .

Optoelectronics : Fiber Optics and Lasers - A Text Lab Manual , 2/e ,

Tischler , McGRAW-HILL 1995 .

The College of Technology in Riyadh
Electronic Technology Department

The study plan

of

Industrial Electronics and Control Division

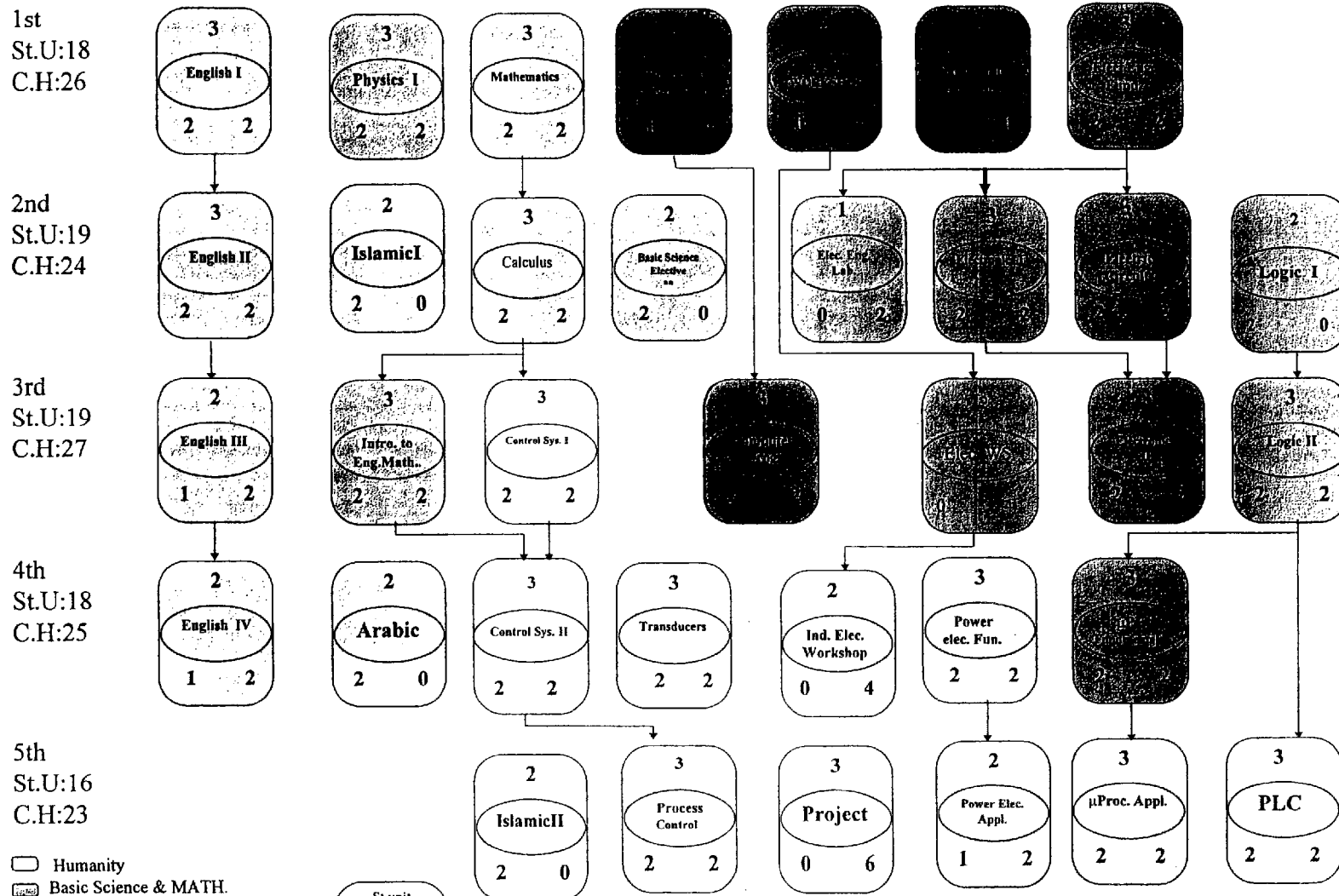
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The Objectives of the Industrial Electronics and Control Technology Program

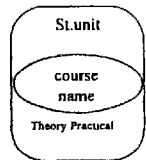
The objective of the Industrial Electronics and Control program is to give the student the necessary qualifications to enable them to be a link between the engineer on one side and the laborers and technicians on the other side.

The program aims at providing the students with:

- A sound training on typical equipment that they will encounter in their practical life to the point of being capable of carrying out practical tasks by himself,
- A good understanding of basic concepts in the areas of Industrial Electronics and Control so that he can communicate with ease with the engineer, and comprehend clearly his duties and tasks,
- The ability to communicate his knowledge to technicians and laborers,
- A good grasp of the computer both as a modern problem solving tool and an efficient equipment for monitoring and controlling modern industrial processes



- Humanity
- Basic Science & MATH.
- Technical Sciences
- Tech. Specialities (Common Courses)
- Tech. Specialities (Division Courses)



INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

* 1 credit tutorial

** Basic Science Elective may be Physics or Chemistry

**ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION**

Semester Plan

Semester : I

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|-----------|------------------------|----|-----|---|-----|----------|
| 1 | English I | 2 | 2 | | 3 | 4 |
| 2 | Physics I | 2 | 2 | | 3 | 4 |
| 3 | Mathematics | 2 | 2 | | 3 | 4 |
| 4 | Intro. to Comp. & App. | 1 | 4 | | 3 | 5 |
| 5 | Basic Workshop | | | 4 | 2 | 4 |
| 6 | Safety and Protection | 1 | | | 1 | 1 |
| 7 | Electrical Eng. Fund. | 2 | 2 | | 3 | 4 |
| | Total | 10 | 12 | 4 | 18 | 26 |

Semester Plan

Semester : II

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|-----------|--|----|-----|---|-----|----------|
| 1 | English II | 2 | 2 | | 3 | 4 |
| 2 | Islamic I | 2 | | | 2 | 2 |
| 3 | Calculus | 2 | 2 | | 3 | 4 |
| 4 | Basic Science Elective (Physics or Chemistry) | 2 | | | 2 | 2 |
| 5 | Electronics I | 2 | 2 | | 3 | 4 |
| 6 | Logic Circuits I | 2 | | | 2 | 2 |
| 7 | Electric Circuits | 2 | 2 | | 3 | 4 |
| 8 | Electrical Eng. Lab. | | 2 | | 1 | 2 |
| | Total | 14 | 10 | | 19 | 24 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Semester Plan

Semester : III

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|-----------|----------------------------|-----------|-----------|----------|-----------|-----------|
| 1 | English III | 1 | 2 | | 2 | 3 |
| 2 | Introduction to Eng. Math. | 2 | 2 | | 3 | 4 |
| 3 | Computer Programming | 2 | 2 | | 3 | 4 |
| 4 | Control Systems I | 2 | 2 | | 3 | 4 |
| 5 | Electronics II | 2 | 2 | | 3 | 4 |
| 6 | Logic Circuits II | 2 | 2 | | 3 | 4 |
| 8 | Electronics Workshop | | | 4 | 2 | 4 |
| | Total | 11 | 12 | 4 | 19 | 27 |

Semester Plan

Semester : IV

| Course No | Course Title | C | L | W | S.U | cont.h/w |
|-----------|---------------------------|-----------|-----------|----------|-----------|-----------|
| 1 | English IV | 1 | 2 | | 2 | 3 |
| 2 | Arabic | 2 | | | 2 | 2 |
| 3 | Control Systems II | 2 | 2 | | 3 | 4 |
| 4 | Transducers | 2 | 2 | | 3 | 4 |
| 5 | μP Fundamentals | 2 | 2 | | 3 | 4 |
| 6 | Industrial Elec. Workshop | | | 4 | 2 | 4 |
| 7 | Power Electronic Fun. | 2 | 2 | | 3 | 4 |
| | Total | 11 | 10 | 4 | 18 | 25 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Semester Plan

Semester : V

| Course No | Course Title | C | L | W | S.U | cont.h/w |
|------------------|----------------------|----------|----------|----------|------------|-----------------|
| 1 | Islamic II | 2 | | | 2 | 2 |
| 2 | Process Control | 2 | 2 | | 3 | 4 |
| 3 | Microprocessor Appl. | 2 | 2 | | 3 | 4 |
| 4 | Power Electr. Appl. | 1 | 2 | | 2 | 3 |
| 5 | PLC | 2 | 2 | | 3 | 4 |
| 6 | Project | | | 6 | 3 | 6 |
| | Total | 9 | 8 | 6 | 16 | 23 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

**ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION**

Humanity courses

| Course No | Course Title | C | LorE | W | S.U | cont.h/w |
|-----------|--------------|----|------|---|-----|----------|
| 1 | English I | 2 | 2 | | 3 | 4 |
| 2 | English II | 2 | 2 | | 3 | 4 |
| 3 | English III | 1 | 2 | | 2 | 3 |
| 4 | English IV | 1 | 2 | | 2 | 3 |
| 5 | Islamic I | 2 | | | 2 | 2 |
| 6 | Islamic II | 2 | | | 2 | 2 |
| 7 | Arabic | 2 | | | 2 | 2 |
| | Total | 12 | 8 | | 16 | 20 |

Basic Science & Mathematics

| Course No | Course Title | C | LorE | W | S.U | cont.h/w |
|-----------|--|----|------|---|-----|----------|
| 1 | Mathematics | 2 | 2 | | 3 | 4 |
| 2 | Calculus | 2 | 2 | | 3 | 4 |
| 3 | Intro. to Eng. Mathematics | 2 | 2 | | 3 | 4 |
| 4 | Physics | 2 | 2 | | 3 | 4 |
| 5 | Basic Science Elective (Physics or Chemistry) | 2 | | | 2 | 2 |
| | Total | 10 | 8 | | 14 | 18 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Technical Sciences

| Course No | Course Title | C | L | W | S.U | cont.h/w |
|-----------|-----------------------------------|---|---|---|-----|----------|
| | Intro. to Comp. & App. | 1 | 4 | | 3 | 5 |
| | Computer Programming | 2 | 2 | | 3 | 4 |
| | Basic Workshop | | | 4 | 2 | 4 |
| | Safety and Protection | 1 | | | 1 | 1 |
| | Total | 4 | 6 | 4 | 9 | 14 |

Technical Specialties (Common Courses)

| Course No | Course Title | C | LorE | W | S.U | cont.h/w |
|-----------|--------------------------------|----|------|---|-----|----------|
| | Elec. Eng. Fundamentals | 2 | 2 | | 3 | 4 |
| | Electronics I | 2 | 2 | | 3 | 4 |
| | Electronics II | 2 | 2 | | 3 | 4 |
| | Logic Circuits I | 2 | | | 2 | 2 |
| | Logic Circuits II | 2 | 2 | | 3 | 4 |
| | μP Fundamentals | 2 | 2 | | 3 | 4 |
| | Electrical Eng. Lab. | | 2 | | 1 | 2 |
| | Electronics Workshop | | | 4 | 2 | 4 |
| | Total | 12 | 12 | 4 | 20 | 28 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

**ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION**

Technical Specialties (Division Courses)

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|------------------|----------------------------------|-----------|---------------|------------|------------|-----------------|
| | Electric Circuits | 2 | 2 | | 3 | 4 |
| | Control Systems I | 2 | 2 | | 3 | 4 |
| | Control Systems II | 2 | 2 | | 3 | 4 |
| | Transducers | 2 | 2 | | 3 | 4 |
| | Industrial Electronics WS | | | 4 | 2 | 4 |
| | Power Electronic Fund. | 2 | 2 | | 3 | 4 |
| | Process Control | 2 | 2 | | 3 | 4 |
| | Power Elec. Applications | 1 | 2 | | 2 | 3 |
| | Microprocessors Appl. | 2 | 2 | | 3 | 4 |
| | PLC | 2 | 2 | | 3 | 4 |
| | Project | | | 6 | 3 | 6 |
| | Total | 17 | 18 | 10 | 31 | 45 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Control Systems I 3 St. Unit : 2 Theory +2 Lab./Exercise

Objectives :

the objective of the course is to enable the student to learn:
basic concepts of control systems, open and closed loop systems transfer functions, block diagrams, construction, operation and properties of basic controllers.

Contents :

Basic Concepts.
Standard Signals and Systems . *Block Diagrams, Signal Flow Graphs,*
Laplace Transforms.
Transfer Functions of Linear Time Invariant systems.
Systems Response to Standard signals.
Controllers.

References :

Dorf R.C, **Modern Control systems**, Addison, 1995

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Control Systems II 3 st. Unit: 2 Theory + 2 Practical

Objectives :

the objective of the course is to enable the students learn how to evaluate the performance of first and second order systems and analyze stability. He learns the characteristics of various controllers and learns methods of adjustments of controller parameters. He learns to draw Bode plots and their use in systems stability analysis.

Contents :

Time Domain Analysis

- First and second order systems
- Controllers
- Error analysis
- Stability analysis

Frequency Analysis

- Frequency Response
- Bode diagram
- Stability analysis from the bode diagram
- Compensation

References :

Dorf R.C, *Modern Control systems*, Addison, 1995

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Industrial Electronic Workshop 2 St. Unit : 0 Theory + 4 Practical

Objectives :

The objectives of the syllabus are to enable students to:

1. Identify, use, inspect ICs chips
2. design and fabricate complex electronic prototype projects.
3. use data book to find the required ICs and their equivalence.
4. design, build, and test timing, pulse, and digital Circuits.

Contents :

power electronic Devices(SCR, Triac, power diodes and transistors).
op- amps, 555, and TTL (gates, compactors, schmitt).
Optoelectronics (optocouplers, 7 segments)
power electronics prototype projects.
Electronic Control Prototype projects.
Digital electronics prototype Projects.

References :

1. R. S. Villanucci, A. W. Avgis , and W. F. Megow, **Electronic Techniques Shop Practice and Construction**, Prentice-Hall,Inc. 1996.
2. R. A. Reis, **Electronic Project Design And Fabrication**, Merill Publishing Company,1989.
3. P. B. Zbar, **Industrial Electronics: A Text-Lab Manual**, MCGraw-Hill,Inc., latest edition

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Microprocessor Applications 3 St. Unit : 2 Theory + 2 Practical

Objectives :

the objective of the course is to enable the student to learn how to interface systems with a microprocessor and the use of microprocessors in instrumentation and control.

Contents :

Advanced Programming .
Programming an EPROM .
Interrupt Process .
Serial and Parallel Interfacing .
A/D and D/A .
Data Communication Buses.
Microprocessors Application in Instrumentation.
Microprocessors Application in Control .

References :

Mitchell, P, **Control Applications of Microcomputers**, Edward Arnold,1988
(or latest)

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Power Electronics Applications 2 St. Unit : 1 Theory + 2 Practical

Objectives :

the objective of the course is to enable the student to learn simple power electronic circuits and their applications in Instrumentation and control.

Contents :

AC Voltage Regulators .
Static Switches.
Power Supplies.
UPS.
Temperature Controlling Circuits.
Pulse width Modulation Circuits.
Display Circuits.
Electronic Stop Watch.
Motor Control .
Stepping Motor Control.
Optoelectronic Devices.
Alarm Circuits.

References :

Petruzella, F.D, **Industrial Electronics**, Mc Graw Hill, 1996

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Power Electronics Fundamentals 3 St. Unit : 2 Theory + 2 Practical

Objectives :

the student gets familiar with semiconductor power electronics devices (operation, characteristics, and application). He learns to analyze different types of power converters.

Contents :

Introduction to Power Electronics .
Power Semiconductor Devices.
Commutation Circuits.
Rectifiers .
DC Choppers .
Inverters.
Cycloconverters.

References :

- 1-Petruzella, F. D, **Industrial Electronics**, Mac Graw Hill, 1996
- 2-Gottlieb, I. M., **Electronic Power Control**, Mac Graw Hill, 1993

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Programmable Logic Controllers 3St. Unit : 2 Theory + 2 Practical

Objectives :

the objective of the course is to get the students acquainted with the fundamentals of Programmable Logic Controllers and their Application.

Contents :

PLC Basics.
Basic PLC Programming.
Basic Functions.
Intermediate Functions.
Advanced Functions.
Applications.

References :

- 1-Berger , H, **Automating with the SIMATIC S5**, Siemens,1992
- 2-Webb, J.W, **Programming Logic Control**, 1995
- 3-Christin A. J, **PLC and their Engineering Applications**, MacGraw Hill,1990
- 4-Warnock, I, **Programmable Controllers Operation and Application**, 1988

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Process Control 3 St. Unit : 2 Theory + 2 Practical

Objectives :

the objective of the course is to get the student acquainted with process control and instrumentation. the student learns the effect of controllers in feedback and feedforward systems. He learns practical methods for the selection of controllers parameters.

Contents :

Basic Concepts.
Modeling Dynamic Systems.
Analyzing Process Characteristics.
Process Control Instrumentation's.
Closed Loop.
Controllers Tuning.

References:

- 1-Jacobs M.J, **Industrial Control Electronics** , Prentice Hall, 1988 (or latest)
- 2-D. E. Seborg, T.F. Edgar and D. A. Mellichamp, **Process Dynamics and Control**, Wiley, 1989

ELECTRONIC TECHNOLOGY DEPARTMENT
INDUSTRIAL ELECTRONICS and CONTROL TECHNOLOGY DIVISION

Transducers 3 St. Unit : 2 Theory + 2 Practical

Objectives :

the objective of the course is to enable the student to learn basic concepts and different types of transducers used in instrumentation and control.

Contents :

Measuring Instruments Characteristics.
Signal Conditioning.
Electromechanical transducers.
Process Variable Transducers.
Photo sensors.

References :

Sinclair, I.R, **Sensors and Transducers**, Newnes (Elsevier), 1992

The College of Technology in Riyadh
Electronic Technology Department

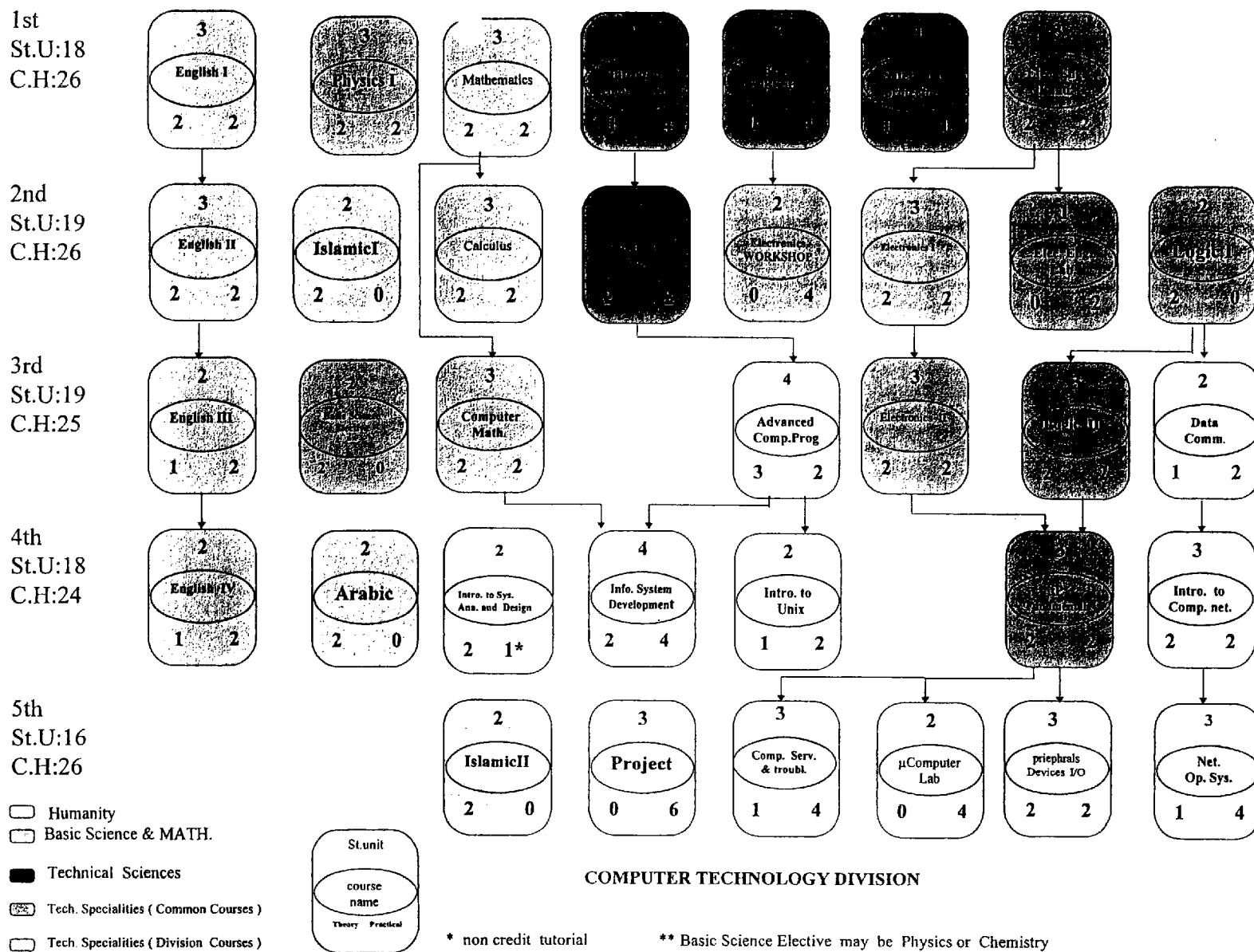
The study plan
of
Computer Division

1997

The Objectives of the computer Technology program

The objective of the computer technology program is to prepare the Saudi graduates of the colleges of technology to be *Assistant Engineer* who is qualified to carry out the following necessary tasks :

1. Clear Understanding of the hardware of computer systems and Their peripherals in order to perform : Installing, Operation, Organization, and Maintenance .
2. Logical reasoning and problem solving using software programming , and the development of moderate application software .
3. Dealing with computer networks in the aspects of : operation, maintenance, standards, devices, cabling, connections and configurations .



ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Semester Plan
Semester : I

| Course No | Course Title | C | L | W | S.U | cont.h/w |
|-----------|------------------------|-----------|-----------|----------|-----------|-----------|
| 1 | English I | 2 | 2 | | 3 | 4 |
| 2 | Physics I | 2 | 2 | | 3 | 4 |
| 3 | Mathematics | 2 | 2 | | 3 | 4 |
| 4 | Intro. to Comp. & App. | 1 | 4 | | 3 | 5 |
| 5 | Basic Workshop | | | 4 | 2 | 4 |
| 6 | Safety and Protection | 1 | | | 1 | 1 |
| 7 | Electrical Eng. Fund. | 2 | 2 | | 3 | 4 |
| | Total | 10 | 12 | 4 | 18 | 26 |

Semester Plan
Semester : II

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|----------------------|-----------|-----------|----------|-----------|-----------|
| 1 | English II | 2 | 2 | | 3 | 4 |
| 2 | Islamic I | 2 | | | 2 | 2 |
| 3 | Calculus | 2 | 2 | | 3 | 4 |
| 4 | Computer Programming | 2 | 2 | | 3 | 4 |
| 5 | Electronics I | 2 | 2 | | 3 | 4 |
| 6 | Electronics Workshop | | | 4 | 2 | 4 |
| 7 | Logic Circuits I | 2 | | | 2 | 2 |
| 8 | Electrical Eng. Lab. | | 2 | | 1 | 2 |
| | Total | 12 | 10 | 4 | 19 | 26 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Semester Plan
Semester : III

| Course No | Course Title | C | L | W | S.U | cont.h/w |
|-----------|--|-----------|-----------|---|-----------|-----------|
| 1 | English III | 1 | 2 | | 2 | 3 |
| 2 | Computer Math. | 2 | 2 | | 3 | 4 |
| 3 | Basic Science Elective (Physics or chemistry) | 2 | | | 2 | 2 |
| 4 | Advanced Comp. Prog. | 3 | 2 | | 4 | 5 |
| 5 | Electronics II | 2 | 2 | | 3 | 4 |
| 6 | Data Communications | 1 | 2 | | 2 | 3 |
| 7 | Logic Circuits II | 2 | 2 | | 3 | 4 |
| | Total | 13 | 12 | | 19 | 25 |

Semester Plan
Semester : IV

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|------------------------------|-----------|-----------|-----|-----------|-----------|
| 1 | English IV | 1 | 2 | | 2 | 3 |
| 2 | Arabic | 2 | | | 2 | 2 |
| 3 | Infor. Sys. Development | 2 | 4 | | 4 | 6 |
| 4 | Intro. to UNIX Op. Sys. | 1 | 2 | | 2 | 3 |
| 5 | μP Fundamentals | 2 | 2 | | 3 | 4 |
| 6 | Intro. to Com. Networks | 2 | 2 | | 3 | 4 |
| 7 | Intro.to Sys. Ana.and Design | 2 | 1* | | 2 | 2 |
| | Total | 12 | 12 | | 18 | 24 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Semester Plan
Semester : V

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|--------------------------|----------|-----------|----------|-----------|-----------|
| 1 | Islamic II | 2 | | | 2 | 2 |
| 2 | μComputer Lab. | | 4 | | 2 | 4 |
| 3 | Peripheral & I/O Devices | 2 | 2 | | 3 | 4 |
| 4 | Comp. Serv. and Troubl. | 1 | 4 | | 3 | 5 |
| 5 | Networks Operating Sys. | 1 | 4 | | 3 | 5 |
| 6 | Project | | | 6 | 3 | 6 |
| | Total | 6 | 14 | 6 | 16 | 26 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Humanity courses

| Course No | Course Title | C | L | W | S.U | cont.h/w |
|-----------|--------------|----|---|---|-----|----------|
| 1 | English I | 2 | 2 | | 3 | 4 |
| 2 | English II | 2 | 2 | | 3 | 4 |
| 3 | English III | 1 | 2 | | 2 | 3 |
| 4 | English IV | 1 | 2 | | 2 | 3 |
| 5 | Islamic I | 2 | | | 2 | 2 |
| 6 | Islamic II | 2 | | | 2 | 2 |
| 7 | Arabic | 2 | | | 2 | 2 |
| | Total | 12 | 8 | | 16 | 20 |

Basic Science & Mathematics

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|--|----|--------|-----|-----|----------|
| 1 | Mathematics | 2 | 2 | | 3 | 4 |
| 2 | Calculus | 2 | 2 | | 3 | 4 |
| 3 | Computer Math. | 2 | 2 | | 3 | 4 |
| 4 | Physics | 2 | 2 | | 3 | 4 |
| 5 | Basic Science Elective (Physics or Chemistry) | 2 | | | 2 | 2 |
| | Total | 10 | 8 | | 14 | 18 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Technical Sciences

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|------------------------|---|--------|-----|-----|----------|
| 1 | Intro. to Comp. & App. | 1 | 4 | | 3 | 5 |
| 2 | Computer Programming | 2 | 2 | | 3 | 4 |
| 3 | Basic Workshop | | | 4 | 2 | 4 |
| 4 | Safety and Protection | 1 | | | 1 | 1 |
| | Total | 4 | 6 | 4 | 9 | 14 |

Technical Specialities (Common Courses)

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|-------------------------|----|--------|-----|-----|----------|
| 1 | Elec. Eng. Fundamentals | 2 | 2 | | 3 | 4 |
| 2 | Elec. Eng. Lab. | | 2 | | 1 | 2 |
| 3 | Electronics I | 2 | 2 | | 3 | 4 |
| 4 | Electronics II | 2 | 2 | | 3 | 4 |
| 5 | Logic Circuits I | 2 | | | 2 | 2 |
| 6 | Logic Circuits II | 2 | 2 | | 3 | 4 |
| 7 | μ P Fundamentals | 2 | 2 | | 3 | 4 |
| 8 | Electronics Workshop | | | 4 | 2 | 4 |
| | Total | 12 | 12 | 4 | 20 | 28 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Technical Specialities (Division Courses)

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|--------------------------------|----|--------|-----|-----|----------|
| 1 | Advanced Comp. Prog. | 3 | 2 | | 4 | 5 |
| 2 | Data Communications | 1 | 2 | | 2 | 3 |
| 3 | Intro. to UNIX Op. Sys. | 1 | 2 | | 2 | 3 |
| 4 | Computer Networks | 2 | 2 | | 3 | 4 |
| 5 | Intro. to Sys. Ana. and Design | 2 | 1* | | 2 | 2 |
| 6 | µComputer Lab. | | 4 | | 2 | 4 |
| 7 | Peripherals & I/O Devices | 2 | 2 | | 3 | 4 |
| 8 | Comp. Service & Troubl. | 1 | 4 | | 3 | 5 |
| 9 | Infor. Sys. Development | 2 | 4 | | 4 | 6 |
| 10 | Networks Op. Systems | 1 | 4 | | 3 | 5 |
| 11 | Project | | 6 | | 3 | 6 |
| | Total | 15 | 32 | | 31 | 47 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Advanced Computer Programming 4 St. Unit : 3 Theory + 2 Practical

Objectives :

The purpose of this course is to introduce the student to advanced methods, and tools for programming for automated solution to problems of medium complexity that require use of composite data structure as well as those that require dynamic data structure .

Contents :

Introduction to Structured Programming

Modular Programming Concepts

Arrays

-One Dimensional Arrays

-Multidimensional Arrays

Structures

User Define Types

String and Text Manipulation

File types

-Sequential Files

-Random Access Files

File Manipulation

Queues and Stack

Pointer Types

Pointer variables

Introduction to Sorting and searching

References :

1. Brian N. Kernighan\ Dennis M. Ritchie , **The C Programming Language**

2. Greg Perry , **C By Example**

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

COMPUTER MATH. 3 St. Unit : 2 Theory + 2 Tutorial

Objectives :

The objectives of the course is to enable the student to cover three areas of mathematics which are highly needed in the computer field these are :
Mathematical logic, Probability & Statistics and Computer aided math.

Contents :

Mathematical logic

- Sets and their members, subsets and intersections.
- Unions, differences and complements.
- Relations and their representation
- Domains and ranges, some operations on relations.

Probability and Statistics

- Introduction to probability.
- Random variables.
- Introduction probability distributions.
- Introduction to statistics.

Computer Aided Math

- Mathmatica.
- Statistica.

References:

- 1-Grassmann Tremblay,**Logic and Discrete Mathematics**, Prentice Hall 1996.
- 2-Ronald E. Walpole,**Probability and Statistics for Engineering and Scientists**, 2ED.
- 3- User Manual for **Mathematica**.
- 4- User Manual for **Statistica**.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Introduction to Computer Networks 3 St. Unit : 2 Theory + 2 Practical

Objectives :

The objectives of the course is to understand the fundamental and basic concepts of computer networks with emphasize on LAN's products. The student should be able to install and operate the hardware and software of the LAN components.

Contents :

- Introduction
- Network Components
- Switching Networks
- OSI
- Packet (X 25 , Frame Relay , ATM)
- Network Media
- Signal Transmission (baseband, and broadband)
- Topology
- Peer to Peer , Client / Server .
- Protocols
- Network Architecture (Ethernet , Token - Ring , Frame Relay , ATM)
- Internetworking
- Network Devices

References :

- 1 - **Networks Essentials Study Guide** , James chellis ,1997, Subex .
- 2 - W. Stallings, **Local and Metropolitan Area Networks** , 4th edition 1993,Macmillan.
- 2 - J. Enck, M. Beckman, **LAN to WAN interconnection** , 1995, McGraw-Hill.
- 3 - G. Keiser, **Local Area Networks** , 1989, McGraw-Hill
- 4 - S. Schatt, **Understanding Local Area Networks** , 1993, SAMS.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Computer Peripherals and I/O Devices 3 St. Unit : 2 Theory + 2 Practical

Objectives :

The objectives of the course is to introduce the student to the peripherals and devices in the computer environment in the aspects of : familiarization , installation, configuration ,operation and servicing.

Contents :

Introduction and Overview of Peripherals.
Disk Drives.
Tape Drives.
Other Storage Devices .
Keyboards.
Optical Scanner and Digitizers .
Mouse.
Printers .
Displays.
Modems.
Terminals.
Character Codes .
Sound Generation.

References :

Leof. Doyle , **COMPUTER PERIPHERALS** , MCGRAW-HILL 1996

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Computer Servicing & Troubleshooting 3 St. Unit : 1 Theory + 4 Practical

Objectives :

The objectives of the course is to get the student familiar with computer servicing ,upgrading SW & HW , mentaining and troubleshooting using different approaches.

Contents :

Computer disassembly and component identification.

Identification and configuration of jumpers and switches.

Upgrading of software and hardware .

Diagnosing using software

-OS commands.

-Utilities (PC Tools , NORTON Utility).

-Diagnosing packages (Check it Pro , Check Sys, Check PC).

-Special diagnosing packages (Spenwrite for HD).

Troubleshooting procedures .

Operation and troubleshooting main parts

-Power supply .

-System board .

-Memory system .

-Hard disk .

-Floppy disk .

-Video controller .

-Keyboard controller .

Taking measurements and reading using

-Multimeters .

-Probes.

-Pulser.

-Oscilloscope .

-Logic analyzers.

References :

1-MARK MINASI ,**The Complete PC Upgrade and Maintenance Guide**
Sybex, 1994

2-Phillie Lalante, **Easy PC Maintenance and Repair** , Printice Hall,1995.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Data Communications 2 St. Unit : 1 Theory + 2 Practical

Objectives :

The objectives of the course is to understand the fundamental terminology and the basic concepts of data communications. The course is designed to give the student the ability to deal with the physical layer of the data communications networking.

Contents :

Introduction

- Concepts and terminology (Frequency spectrum, bandwidth, and SNR).
- Analog and Digital Transmission.

Data Communication system: (Definitions , functions, and basic components)

Introduction to Data Communication Networks

- The need for networks.
- Requirements (Performance, consistency, reliability, recovery, and security).
- Applications (Videotext, Satellite, Public Communication networks,
- Teleconferencing, Telecommuting, Electronic mail, Home banking,
- Electronic funds transfer, Information utility services, Electronic bulletin boards, Value added networks.
- Integration of services : ISDN and BISDN.
- Interconnection of Networks.

Layered Communication Architectures:

- OSI standards architecture and protocols.
- Unified view of OSI protocols.
- X.25 protocol.
- Systems Network Architecture SNA.

Physical Layer:

- Signal propagation.
- Asynchronous and synchronous transmission .
- Serial and parallel transmission.
- Simplex, half duplex, and full duplex transmission.
- Error detection techniques : parity check , and CRC .
- Multiplexers (FDM, TDM, and STDM).
- Types of multiplexers.
- Concentrators.
- Private Branch Exchanges PBX.
- Line Adapter.
- Transmission Media.
- Modems.
- Interfacing to RS 232 port.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

- Terminals and codes for data communications.
- Terminals classifications.
- Data Encoding.
- Analog Data, Digital signal : PCM
- Digital data , digital signal : NRZ , and biphase codes .
- Digital data , analog signals : ASK , FSK and PSK.
- Modes of Transmission (Data flow, physical connection, timing, standard digital codes).

Data Link Layer

- Data link protocols.
- Examples of data link layer.

Transport, Session, and Presentation:

- Transport Layer.
- Transmission Control Protocol TCP.
- User Datagram Protocol UDP.
- Session Layer.
- Encryption.
- Data Compression.

Network Layer:

- Names and addresses.
- Routing.
- Congestion Control.
- Network Design.

Local Area Networks LAN:

- ALOHA topology.
- Ethernet : CSMA/CD.
- Token passing.
- DDI.

References :

- 1- E. Ramos, A. Schroeder, and A. Beheler, **Data Communications and Networking Fundamentals using Novell Netware**, 1996, Prentice Hall.
- 2 - W. Stallings, **Data and Computer Communications** , 5th edition 1996, Macmillan.
- 3 - G. Keiser, **Local Area Networks** , 1989, McGraw-Hill.
- 4 - F. Halsall, **Data Communications, Computer Networks and OSI** , 1988, Addison-Wesley.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Information System Development 4 St.Unit : 2 Theory + 4 Practical

Objectives :

The intention of this course is to introduce students to database systems and train them in using modern development tools. The course is carried out as complete IS mini project(s) [one or two projects] which are implemented using a selected development environment.

The projects are based on a fairly realistic samples of applications. Screen and data I/O oriented processes are automated with main emphasis being on the user interface design and system functionality issues. Some other aspects of IS design concepts, such as standards, usability, modularity, connectivity and networking, data consistency, reliability, ease of maintenance, user friendliness, flexibility, are also touched.

Contents :

- Introduction to database systems .
- Introduction to information systems development and basic definitions (where the chosen tool is introduced to the students)
- The development methodology .
- Windows design basics .
- Information modeling .
- Creation of the database and tables .
- The tools to be introduce is ACCESS.
- Queries and forms .
- Reports .

References :

- 1- Elmasri / Narathe, **Fundamentals of Database Systems,**
- 2- J.Dranchak and J.LaCroce, **Building ACCESS 2 Applications,** John wiley,1995
- 3- A.Fisher, **CASE Using Software Development Tools,** 2nd. ed , John wiley,1991
- 4- Krohn, **Using the ORACLE Toolset,** John wiley,1997
- 5- **,Database Concepts and Architecture,**
- 6- **, The Principles of the Relational Model,**

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Microcomputer Lab. 2 St. Unit : 0 Theory + 4 Practical

Objectives :

The objectives of the course is to enable student to utilize his knowledge of microprocessor course to build a microprocessor based system starting from scratch, construction is performed with the aid of tools such as : probes , logic pulser and logic analyzer.

Contents :

8085 Pins , input/output system .
Address lines , Data lines and Control signals.
Memories : types , specifications, and Pin connectors.
Parallel peripheral interface.
Serial peripheral interface.

References :

Jhon Uffenbeck, **Microcomputers and Microprocessors
The 8080,8085 and Z-80
Programming ,Interfacing and Troubleshooting.,1995**

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Network Operating Systems 3 St. Unit : 1 Theory + 4 Practical

The objective of this course is to give student the practice on computer networks operating systems in the aspects of : installation , configuration and an introduction to administrations. The case study is either window NT or Novel netware.

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Introduction to Systems Analysis and Design 2St. Unit: 2 Theory + 1* Tutorial

Objectives :

Introduce basic concepts of traditional structured approach to systems analysis and design, as well as modern emerging system software development methodologies based on CASE and relational DBMS tools.

Contents :

Introduction to analysis and design

The system development process

- Requirement Definition
- Feasibility Study
- Analysis
- System Design
- Detailed Design
- Implementation and Maintenance

References :

- 1-Len Fertuck , **System Analysis and Design**
- 2-Williams. Davis, **Systems Analysis and Design a Structure Approach**

ELECTRONIC TECHNOLOGY DEPARTMENT
COMPUTER TECHNOLOGY DIVISION

Introduction to UNIX 2 St. Unit : 1 Theory + 2 Practical

Objectives :

The purpose of this course is to introduce and use the basic concepts of operating systems, and to introduce the student to UNIX .

Contents :

Introduction .
Computer-System Structure .
Operating-System Structure .
Operating System Services .
What is UNIX .
The UNIX Connection .
Starting with X window .
The Online UNIX Manual .
Command Syntax .
The Shell .
The Emax Editor .
Communication wit Other People .

References :

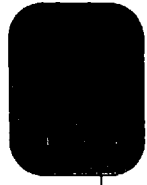
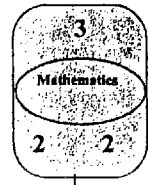
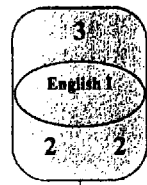
- 1-Filberfchadz-Galvin , Operating Systems Concepts
- 2- Harley Hahn, **A Student's Guide to UNIX** , McGraw-Hill 1993

The College of Technology in Riyadh
Electronic Technology Department

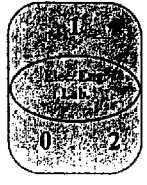
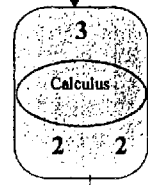
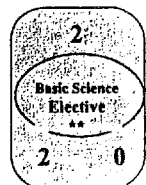
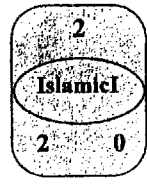
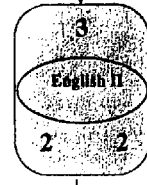
The study plan
of
Communications Division

1997

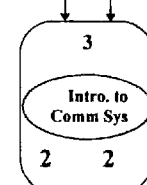
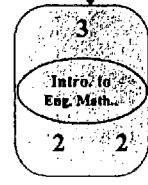
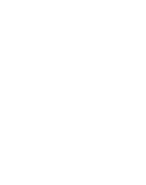
1st
St.U:18
C.H:26



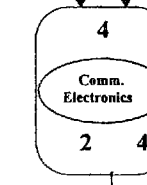
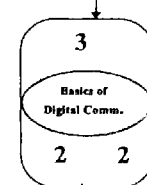
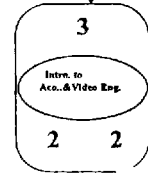
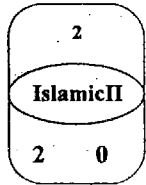
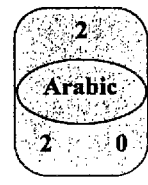
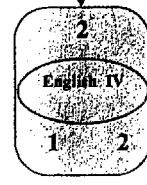
2nd
St.U:19
C.H:24



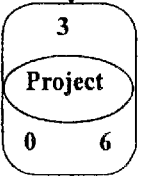
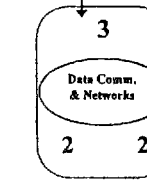
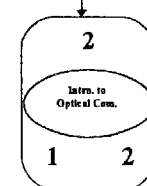
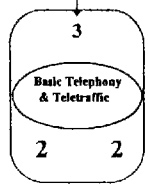
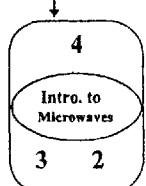
3rd
St.U:19
C.H:27



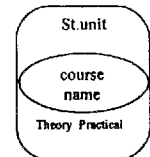
4th
St.U:19
C.H:25



5th
St.U:15
C.H:22



- Humanity
- Basic Science & MATH.
- Technical Sciences
- Tech. Specialities (Common Courses)
- Tech. Specialities (Division Courses)



COMMUNICATIONS TECHNOLOGY DIVISION

* non credit tutorial

** Basic Science Elective may be Physics or Chemistry

The Objectives of the Communications Technology program

This program is designed to give a broad knowledge in the different fields of Communication systems with emphasizing on practical aspects and applications.

The graduate of this program should be capable to fit within any maintenance or operation job in the field of communication systems.

The program aims at providing the student with:

- A sound training on typical communication equipments that he will encounter in their practical life to the point of being capable of carrying out practical tasks by himself.
- A good understanding of the basic concepts in the different areas of communications so that he comprehends clearly his duties and tasks,
- The ability to communicate his knowledge and skills to less qualified personnel such as technicians and laborers,
- The ability to install, operate, maintain and repair various communication equipment.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Semester Plan

Semester : I

| Course No | Course Title | C | L/E | W | S.U | cont. H |
|-----------|------------------------------|-----------|-----------|----------|-----------|-----------|
| 1 | English I | 2 | 2 | | 3 | 4 |
| 2 | Safety and Protection | 1 | | | 1 | 1 |
| 3 | Introd. to Comp. & Applics. | 1 | 4 | | 3 | 5 |
| 4 | Physics I | 2 | 2 | | 3 | 4 |
| 5 | Basic Workshop | | | 4 | 2 | 4 |
| 6 | Electrical Eng. Fundamentals | 2 | 2 | | 3 | 4 |
| 7 | Mathematics | 2 | 2 | | 3 | 4 |
| | Total | 10 | 12 | 4 | 18 | 26 |

Semester Plan

Semester : II

| Course No | Course Title | C | L/E | W | S.U | cont. H |
|-----------|--|-----------|-----------|---|-----------|-----------|
| 1 | English II | 2 | 2 | | 3 | 4 |
| 2 | Calculus | 2 | 2 | | 3 | 4 |
| 3 | Elec. Eng. Lab. | | 2 | | 1 | 2 |
| 4 | Electric Circuits | 2 | 2 | | 3 | 4 |
| 5 | Electronics I | 2 | 2 | | 3 | 4 |
| 6 | Basic Science Elective (Physics or Chemistry) | 2 | | | 2 | 2 |
| 7 | Islamic Culture I | 2 | | | 2 | 2 |
| 8 | Logic Circuits I | 2 | | | 2 | 2 |
| | Total | 14 | 10 | | 19 | 24 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Semester Plan Semester : III

| Course No | Course Title | C | L/E | W | S.U | cont. H |
|-----------|---------------------------|-----------|-----------|----------|-----------|-----------|
| 1 | English III | 1 | 2 | | 2 | 3 |
| 2 | Computer Programming | 2 | 2 | | 3 | 4 |
| 3 | Eng. Mathematics | 2 | 2 | | 3 | 4 |
| 4 | Introduction to Comm.Sys. | 2 | 2 | | 3 | 4 |
| 5 | Electronics II | 2 | 2 | | 3 | 4 |
| 6 | Logic Circuits II | 2 | 2 | | 3 | 4 |
| 7 | Electronic Workshop | | | 4 | 2 | 4 |
| | Total | 11 | 12 | 4 | 19 | 27 |

Semester Plan Semester : IV

| Course No | Course Title | C | L/E | W | S.U | cont. H |
|-----------|----------------------------------|-----------|-----------|---|-----------|-----------|
| 1 | English IV | 1 | 2 | | 2 | 3 |
| 2 | Arabic | 2 | | | 2 | 2 |
| 3 | Islamic II | 2 | | | 2 | 2 |
| 4 | Introd. to Acoustic & Video Eng. | 2 | 2 | | 3 | 4 |
| 5 | Basics of Digital Comm. | 2 | 2 | | 3 | 4 |
| 6 | μProcessor Fundamentals | 2 | 2 | | 3 | 4 |
| 7 | Communication Electronics | 2 | 4 | | 4 | 6 |
| | Total | 13 | 12 | | 19 | 25 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

**ELECTRONIC TECHNOLOGY DEPARTMENT
COMMUNICATIONS TECHNOLOGY DIVISION**

**Semester Plan
Semester : V**

| Course No | Course Title | C | L/E | W | S.U | cont. H |
|------------------|-------------------------------|----------|------------|----------|------------|----------------|
| 1 | Basic Telephony & Teletraffic | 2 | 2 | | 3 | 4 |
| 2 | Introd. to Optical Comm. | 1 | 2 | | 2 | 3 |
| 3 | Data Comm. & Networks | 2 | 2 | | 3 | 4 |
| 4 | Introd. to Microwaves | 3 | 2 | | 4 | 5 |
| 5 | Project | | | 6 | 3 | 6 |
| | Total | 8 | 8 | 6 | 15 | 22 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

**ELECTRONIC TECHNOLOGY DEPARTMENT
COMMUNICATIONS TECHNOLOGY DIVISION**

Humanity courses

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|-----------|--------------|----|-----|---|-----|----------|
| 1 | English I | 2 | 2 | | 3 | 4 |
| 2 | English II | 2 | 2 | | 3 | 4 |
| 3 | English III | 1 | 2 | | 2 | 3 |
| 4 | English IV | 1 | 2 | | 2 | 3 |
| 5 | Islamic I | 2 | | | 2 | 2 |
| 6 | Islamic II | 2 | | | 2 | 2 |
| 7 | Arabic | 2 | | | 2 | 2 |
| | Total | 12 | 8 | | 16 | 20 |

Basic Science & Mathematics

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|-----------|--|----|-----|---|-----|----------|
| 1 | Mathematics | 2 | 2 | | 3 | 4 |
| 2 | Calculus | 2 | 2 | | 3 | 4 |
| 3 | Intro. to Eng. Mathematics | 2 | 2 | | 3 | 4 |
| 4 | Physics I | 2 | 2 | | 3 | 4 |
| 5 | Basic Science Elective (Physics or Chemistry) | 2 | | | 2 | 2 |
| | Total | 10 | 8 | | 14 | 18 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

**ELECTRONIC TECHNOLOGY DEPARTMENT
COMMUNICATIONS TECHNOLOGY DIVISION**

Technical Sciences

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|-----------|------------------------|----------|----------|----------|----------|-----------|
| 1 | Intro. to Comp. & App. | 1 | 4 | | 3 | 5 |
| 2 | Computer Programming | 2 | 2 | | 3 | 4 |
| 3 | Basic Workshop | | | 4 | 2 | 4 |
| 4 | Safety and Protection | 1 | | | 1 | 1 |
| | Total | 4 | 6 | 4 | 9 | 14 |

Technical Specialties (Common Courses)

| Course No | Course Title | C | L or E | W/E | S.U | cont.h/w |
|-----------|-------------------------|-----------|-----------|----------|-----------|-----------|
| | Elec. Eng. Fundamentals | 2 | 2 | | 3 | 4 |
| | Electronics I | 2 | 2 | | 3 | 4 |
| | Electronics II | 2 | 2 | | 3 | 4 |
| | Logic Circuits I | 2 | | | 2 | 2 |
| | Logic Circuits II | 2 | 2 | | 3 | 4 |
| | μ P Fundamentals | 2 | 2 | | 3 | 4 |
| | Electronics Workshop | | | 4 | 2 | 4 |
| | Elec. Eng. Lab. | | 2 | | 1 | 2 |
| | Total | 12 | 12 | 4 | 20 | 28 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

**ELECTRONIC TECHNOLOGY DEPARTMENT
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Technical Specialties (Division Courses)

| Course No | Course Title | C | L/E | W | S.U | cont.h/w |
|------------------|-----------------------------|----------|------------|----------|------------|-----------------|
| 1 | Electric Circuit | 2 | 2 | | 3 | 4 |
| 2 | Intro. to Comm. System | 2 | 2 | | 3 | 4 |
| 3 | Intro. to Acou. & Vid. Eng. | 2 | 2 | | 3 | 4 |
| 4 | Basics of Digital Comm. | 2 | 2 | | 3 | 4 |
| 5 | Comm. Electronics | 2 | 4 | | 4 | 6 |
| 6 | Introduction to Microwaves | 3 | 2 | | 4 | 5 |
| 7 | Basic Tel. & Teletraffic | 2 | 2 | | 3 | 4 |
| 8 | Intro. to Opt. Comm. | 1 | 2 | | 2 | 3 |
| 9 | Data Comm. & Networks | 2 | 2 | | 3 | 4 |
| 10 | Project | | | 6 | 3 | 6 |
| | Total | 18 | 20 | 6 | 31 | 44 |

W: Workshop, C: Lecture Session, L: Lab, T: Training, S.U: Study Unit

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Introduction to Communication Systems 3 St. Unit : 2 Theory + 2 Practical

Objectives :

The student will be able to understand and know:

- 1- The basic elements of communications systems.
- 2- The Furrier analysis techniques.
- 3- The concept of analog modulations and techniques.
- 4- The concept of multiplexing using frequency division multiplexing.

Contents :

General view

- Aims of the course .
- Elements of a communication system (block diagram).
- Types of links .
- Types of information ;voice ,video and data .
- Types of signals ;continuous (analogue) and discrete (digital).
- System properties : causality , linearity ,time-varying ,...etc. .

Review on Spectral Analysis

- Frequency and time domains .
- Furrier expansion (FE) ; power spectrum ...etc. .
- Furrier transform (FT) and its properties .

Analog Modulation and demodulation Techniques

- Amplitude modulation (AM) and demodulation :
 - double sideband suppressed carrier (DSBSC) .
 - single sideband (SSB) and vestigial sideband (VSB) .
- Quadrature amplitude modulation (QAM)
- Angle Modulation .
- *Frequency modulation (FM) and demodulation (Bessel functions)
- *Phase modulation (PM) and demodulation

Multiplexing Techniques

- Introduction.
- Frequency division multiplexing (FDM).

Noise

- Sources of noise.
- Effect on analog signals .

References:

- 1- O'Relly,J.J., **Telecommunication Principles**, Champion and Hall, 1992.
- 2- Fenlelliet, **Telecommunication System**, 1986.
- 3 - Lathi,B.P., **Communication Systems ”**,
- 4 - Stremler, **Introduction to communication Systems**, 1982.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Introduction to Acoustics & Video Engineering 3 St. Unit : 2 Theory+2 Practical

Objectives :

The student will be able to understand and know:

- 1- The nature of sound.
- 2- Wave terminology, and Microphones principles.
- 3- Television broadcasting and picture principles.

Contents :

Part I: Introduction to Acoustics Engineering

Fundamentals and Definitions

- Nature of sound; analogy between E/M wave and acoustic wave .
- Wave terminology (plane, acoustic, spherical, progressive and standing waves).
- Frequency and speed of sound.
- Wavelength, displacement and amplitude.
- Particle velocity.

Decibels

- The decibel, reference levels and decibel problems.

Microphones and Placement

- Introduction.
- Acoustic mode of microphone.
- Electrical operation (The dynamic, ribbon and condenser microphones).
- Polar and frequency responses.
- Microphone filters.
- Care of microphone.
- Microphone selection.

Special Microphones

- Noise canceling microphones .
- Wireless or radio microphones .
- Highly directional microphones (parabolic and gun mikes) .

Part II : Introduction to Video Engineering

Applications of Television

- Television broadcasting and channels
- Closed -circuit television
- Satellites for worldwide television.
- Video phone.
- CRT numerical displays
- Video recording .
- development of television broadcasting .

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Introduction to Acoustics & Video Engineering (Cont.)

The Television Picture

- Picture elements .
- Horizontal and vertical scanning .
- Motion pictures .
- Frame and field frequencies .
- Horizontal and vertical scanning frequencies .
- Horizontal and vertical Synchronization .
- The 3.58-MHz color signal
- Picture qualities .
- The 6-MHz television broadcasting channel .
- Standards of transmission .

Television Cameras

- Camera-tube requirements .
- Silicon target plate .
- CCD
- Spectraflex color camera tube .
- Definition of light units .

Scanning and Synchronizing

- The sawtooth waveform for linear scanning .
- Standard scanning pattern .
- A sample frame of scanning .
- The synchronizing pulses .
- Scanning and synchronizing frequencies .

References :

- 1- Bernard Grob, **Basic Television Principles and Servicing** , 4th Edition, McGraw-Hill, 1975.
- 2- Ginn, K. B., **Architectural Acoustics** , Bruel and Kjoer, 1988.
- 3- Graford, M.I., **Electro Acoustics** , Butterworth, London, 1970.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Basics of Digital Communications 3 St. Unit : 2 Theory +2 Practical

Objectives :

The student will be able to understand and know:

- 1 - The basic elements of digital communication system.
- 2 - The different phases of PCM.
- 3 - The different techniques of digital modulation.
- 4 - The concept of time division multiplexing.
- 5 - The spread spectrum techniques.

Contents :

Introduction

- Elements of a digital communication system .
- Advantages and disadvantages of digital signaling .

Sampling Process

- Sampling Theorem .
- Reconstruction .
- Analog -to-Digital (A/D) and Digital -to- Analog (D/A) converters .

Pulse Code Modulation (PCM)

- PCM system . -Level of quantization .
- Bandwidth required for PCM transmitter .
- Differential PCM (DPCM) .
- Delta modulation (DM) .

Digital Modulation Techniques

- Amplitude Shift Keying (ASK) .
- Frequency Shift Keying (FSK) .
- Phase Shift Keying (PSK) .

Detection Techniques

Digital Multiplexing Techniques

- Time division multiplexing (TDM) .
- Statistical time division multiplexing (STDMM) .

Noise in Digital Communications

Spread Spectrum Techniques

References :

- 1- Simon Haykin, **Digital Communications** , John Wiley, 1988.
- 2- O'Reilly,J.J., **Telecommunication Principles**, Champion and Hall, 1992.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Communication Electronics 4 St. unit : 2 Theory + 4 Practical

Objectives :

- 1- To understand the functions and circuit diagrams of the basic units of the communication systems using IC's.
- 2- The student will be able to build and test these circuits.

Contents :

Phase - Locked Loop (PLL) Circuits

- Fundamentals of PLL
- Some of Applications of PLL

Analog-to-Digital (A/D) & D/A Conversion

- Principles
- A/D & D/A Circuits
- Codecs

Analog Modulation & Detection Circuits

- DSB, DSBSC, SSB and VSB
- FM

Multiplexing Circuits

- FDM
- TDM
- PCM

Digital Modulation & Detection Circuits

- ASK
- FSK
- PSK

References:

- 1- Miller, G.M., **Modern Electronic Communication**, Prentice Hall, 1996.
- 2- Frenzele, L.E., **Communication Electronics**, McGraw Hill, 1995.
- 3- Soclof, S., **Design and Applications of Analog Integrated Circuits**, Prentice Hall, 1991.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Introduction to Microwaves 4 St. Unit : 3Theory + 2 Practical

Objectives :

The student will be able to understand and know :

- 1- The parameters of transmission lines.
- 2 - The function of basic microwave components and generating devices.
- 3 - The general concepts of different types of antenna & characteristics.
- 4- How a communication link can be built using the satellite.
- 5- The different stages of satellite subsystems & parameters.

Contents :

Introduction to Basic Microwave Systems

- Microwave communication systems stages .
- Comparison between wire and wireless communications .

Transmission Lines

- Types of transmission lines.
- Transmission line: equations, characteristic impedance and propagation constant.
- Standing wave ratio and matching.
- Transmission line applications.

Wave Propagation

- Electrical to electromagnetic conversion.
- Electromagnetic (EM) waves
- Reflection, refraction and diffraction of EM waves.
- E M waves propagation.

Waveguides and Radar

- Comparison of transmission systems.
- Types of waveguides.
- Rectangular waveguides: TM and TE modes.
- Directional coupler and cavity resonators.
- Radar.

Generation of Microwaves

- Microwave tubes.
- Microwave devices: Gunn oscillator, bipolar and FE transistors.

Antenna Fundamentals

- Basic antenna theory.
- Linear dipole antenna: directivity , gain and radiation.
- Frii's Transmission Formula .
- Radiation resistance.
- Antenna feed lines.
- Antenna arrays.
- Microwave antennas: Horn and parabolic.

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COMMUNICATIONS TECHNOLOGY DIVISION**

Introduction to Microwaves (Cont.)

Satellite Communications

- Introduction
- Satellite orbits
- Satellite subsystems
- Earth Stations

References:

- 1- Miller, G.M., **Modern Electronic Communication**, Prentice Hall, 1996.
- 2 - Hund, E., **Microwave Communications : Components and Circuits** , McGraw-Hill, 1989.
- 3 - Kraus, J.D., **Antennas** , 2nd edition, McGraw-Hill, 1988.
- 4 - Pratt, T., and Bostian,C.W., **Satellite Communications**, John Wiley,1986.
- 5 - Ha,T.T., **Digital Satellite Communications**, McGraw-Hill,1990.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Basic Telephony & Teletraffic 3 St.Unit : 2 Theory + 2 Practical

Objectives :

At successful conclusion of course each student will understand :

- 1-The main principles and functions of different telephone relays, exchanges, set, and subscriber line network .
- 2-The telephone network structures and routing process for different traffic cases
- 3- The basic principles of the numbering plan, and charging plan.

Contents :

Telephony Relays & diagrams

- Types of relays in telephony
- Types of contacts
- Types of diagrams in telephony

Telephone Exchange Fundamentals

- Types of exchanges
- The fundamental blocks in an exchange
- The functions of local exchange
- The functions of other types of exchanges

The Telephone Set and Subscriber Line Network

- The main functions of a telephone set
- The main sections of a telephone set (dial and push button)
- The function of each element in the telephone set
- The subscriber line network

The Telephone Network Structure

- Types of networks and network structures
- Network hierarchy and routing strategy
- National digital networks and synchronization

The Fundamental Plans

- International organization for telecommunications
- Numbering plan (local, national, & international)
- Charging plan
- Other fundamental plans

Signaling Systems

- The main properties of a signal
- The different types of signaling
- Digital signaling network

Telephone Traffic

- Telephone traffic and telephone density
- Variations in telephone traffic
- Erlang's loss and delay systems
- Traffic processing

References:

- 1- Hills, M.T, **Telecommunications Switching Principles** ,The MIT,1982
- 2- Flood, I.E , **Telecommunication Network** ,Peter Peregrinus Ltd, 1977
- 3- Bella,John, **Digital Telephony**, John Willy, 1991

ELECTRONIC TECHNOLOGY DEPARTMENT

COMMUNICATIONS TECHNOLOGY DIVISION

Introduction to Optical Communications 2 St. Unit : 1 Theory + 2 Practical

Objectives :

The student will be able to understand and know:

- 1- The basic elements of optical communication system & characteristics.
- 2- How to install and test the optical fibers in communication system.

Contents :

Introduction

- The elements of optical communication systems .
- Spectrum of optical waves .

Optical Sources and Detectors

- Optical sources : light emitting diode (LED) and lasers .
- Optical detectors : PIN diode ,Avalanche photodiode and phototransistors .

Fundamental characteristics of Optical Fibers

- Fiber structure and propagation properties .
- Numerical aperture and acceptance .
- Attenuation . - Bandwidth . - Single mode and multimode fibers .

Transmission systems using Fiber Optics

- Modulation of light - Transmission capacity .
- Transmission limits and interference

Splices and Connectors

- Loss factor - Transmission loss measurements .
- Splicing of multimode fibers . - Connectors .

Optical Fiber Testing

- Evaluation of transmission properties.
- Refractive index profile .
- Measurements of geometrical characteristics .

References :

- 1 - Tricker,R.L., **Optoelectronic line transmission**, Heinemann Newes, 1989.
- 2 - Baronski, **Fundamentals of Optical Fiber Communications**, 1981.

ELECTRONIC TECHNOLOGY DEPARTMENT COMMUNICATIONS TECHNOLOGY DIVISION

Data Communications & Networks 3 St. Unit : 2 Theory + 2 Practical

Objectives :

To understand the fundamental terminology and basic concepts of data and computer communications with emphasize on LAN's products. The student should be able to install and layout the network cabling.

Contents :

Introduction

- A data communications model.
- Data transmission

Data Encoding

- Digital data, digital signal; NRZ, and biphasic codes.
- Digital data, analog signals; ASK, FSK and PSK.
- Modems

Digital Data Communication Techniques

- Asynchronous and synchronous transmission.
- Error detection techniques; parity check, CRC.
- Interfacing; RS-232C, and ISDN.

Data Link Control

- Line configuration; point-to-point and multipoint, simplex, half duplex and full duplex.
- Flow control.
- Error control.
- Data link protocols: frame structure; HDLC.

Switching Networks

- Circuit -Switched Networks: digital PBX .
- Packet- Switched Networks: virtual circuits and datagram.
- X.25

LANs Technology

- Overview of LAN technology
- Topology and media; Metallic, and Optical.
- Signaling: baseband, and broadband.
- Medium Access Control protocols: CSMA / CD, and Token ring .
- Standards: IEEE 802.2, 802.3 (10Base-T), 802.5, and FDDI.
- Ethernet: specifications and components ; NIC , hubs ,workstations and network servers.

Internetworking

- Bridging and Brouting.
- gateways.

References:

- 1 - W. Stallings, **Data and Computer Communications** , 4th edition, Macmillan ,1994.
- 2 - G. Keiser, **Local Area Networks**, McGraw-Hill, 1989.