



**DR. A P J ABDUL KALAM UNIVERSITY,
INDORE**

SYLLABUS

For

**DIPLOMA COMPUTER SCIENCE ENGINEERING
(FIRST YEAR, 2nd SEM)**

(Session July- December 2016)

College of Polytechnic Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Computer Engineering

List of Subject (First Year, 2nd Sem)

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Unit 1: Introduction to 'C' Programming:

Algorithms, Flowcharts, structured programming Concepts, History and features of 'C', 'C' Programme structure, Pre-processor directives. Character set and data types set of 'C', identifiers, keywords, variables, Constants, data types, int, float, double, char, Qualifiers, long, short, unsigned and signed data type conversion, Escape sequences \b etc.), Comments. Operators and Expressions Relational, Logical, Assignment operators, unary & ternary operators, hierarchy of operators. Input & Output Statements Output statements, Printf, Scanf, getchar, putchar, Conversion specifiers in format control string

Unit 2: Decision Control Statements:

Conditional branching statements: if statement, if- else, nested if. use of logical operators and Compound Relational Tests. Unconditional branching: goto. Multiple branching statements: switch case statement.

Unit 3: Loop Control Statements:

Loop Statements: syntax and use of 'for' statement, while statement, 'Do-while' statement, 'break-continue' statement, nested looping.

Unit 4: Arrays & Strings:

Arrays- Concept of one dimensional and Multi- dimensional array, array declaration, Array initialisation, operations on one and two dimensional arrays. String Manipulations - Strings, gets, puts, string operations, string function (concatenation, comparison, length of a string etc.)

Unit 5: Functions & Macro:

Library and User-Defined Functions, Concepts of library functions, Library functions (ceil, floor, exp, log, pow, fmod, abs, fabs, rand, srand, toupper, tolower, toascii etc.) user-defined Functions, Function declaration, Function prototype, local and global variables. Parameter passing mechanisms, recursion. Storage classes –static auto, extern, register. simples and Conditional Macros and Its expansions

Unit 6: Pointers:

Definition, Types, Declaration, & and * operator, pointer expression, pointer arithmetic, pointer to pointer, array of pointer, pointer to function. Dynamic memory management functions-malloc, calloc and free.

Unit 7: Structure, Union and Enumeration:

Structure:-Definition, Declaration, initializing structure, membership operator, accessing structure elements, structure within structure , array of structure, pointer to structure.

Union:-Definition, Declaration and Implementations. Enumerated Data Type:- Definition, Declaration and Type Def. Command line argument.

Unit 8: File handling:

File system basics, Opening & closing file, Reading & writing in file, File opening modes, String I/O in files.

References

- [1] Programming in C Balaguruswamy Tata MacGrawhills
- [2] Let Us Learn C Yashwant Kanetkar, BPB Publications
- [3] The Spirit of C Mullish Cooper Jaico Publishing House Mumbai
- [4] The C Programming Kernighan, Brian W.; Dennis M. Ritchie, Prentice Hall
- [5] C: The Complete Osborne Media; Herbert Schildt,4 edition, McGraw-Hill
- [6] Exploring C Yashwant Kanetkar BPB Publications

List of Experiments

1. Assignment to prepare general algorithms and flow chart.
2. Study of turbo C editor
3. Assignment to write character, operator set of C Language.
4. Assignment to identify valid and invalid variables, constants and expressions.
5. Program based on Input/Output statements.
6. Programs based on Arithmetic expression
7. Programs based on goto statement
8. Programs based on 'if' and 'Nested if'
9. A Program based on 'switch case' statement.
10. At least one program based on each:
 - i. 'for' statement
 - ii. 'while' statement
 - iii. 'do-while' statement
 - iv. break continue statement
11. program based on pointer expression.
12. program based on pointer arithmetic.
13. program based on pointer to pointer.
14. program based on array of pointer
15. program based on dynamic memory management functions.
16. Program based on two dimensional array.
17. Program based on Library functions
18. Programs based on string operations
19. Programs based on functions.
20. program based on pointer to function
21. program based on Parameter passing mechanisms.
22. programs based on recursion
23. program based on macros.
24. program based on storage classes.
25. program based on structure, union and enumeration.
26. program based on command line argument
27. programs based on files.

Unit 1: Introduction to Environment:

The Biosphere, biotic and abiotic, an aquatic ecosystem, types of pollution, Impact of human being on environment, Impact of environment on human being, Basic approach to improve environmental qualities, role of an environmental engineer.

Unit 2: Air Pollution Sources and Effects:

Standard definition of air pollution, Composition of natural air, Names of air pollutants, Classification of air pollutants, primary and secondary pollutants, Classification of source of air pollutants on different bases, Definition of different types of aerosols. Effect of air pollution on: human health, material properties, vegetation, Major toxic metals and their effects, Major environmental phenomenon e.g., acid rain, global warming, green house effect, ozone layer depletion. Air quality standards, Brief description of air pollution laws.

Meteorological Aspects Of Air Pollutant Dispersion

Meteorological parameters influencing air pollution, Environmental lapse rate, temperature inversion, atmospheric stability and adiabatic loss rate, Turbulence, topographical effects, Plume behavior, looping, coning, fanning fumigation, lofting, trapping.

Unit 3: Air Pollution Control Methods and Equipments:

Natural purification processes of air, Artificial purification methods of air, Brief description of following control equipments along with sketch e.g, gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator, Brief description of following processes for the control of gaseous pollutants e. g., absorption, adsorption, condensation, combustion etc.

Unit 4: Water Pollution Sources and Classification:

Water resources, Uses of water, Classification of water Origin, composition and characteristics of domestic waste water as well as industrial waste water, Biochemical oxygen demand, Water pollution laws and standards, Uses of waste water, Classification of waste water, Chemical oxygen demand.

Waste Water Treatment Method

Basic processes of water treatment, Meaning of primary, secondary and tertiary treatment, Flow chart of a simple effluent treatment plant, Theory of industrial waste treatment, Volume reduction, neutralization and proportioning.

Unit 5: Solid Waste Management:

Sources and classification of solid waste, Public health aspects, Disposal methods—open dumping, sanitary, land fill, Incineration, compositing, Potential methods of disposal, Recovery and recycling of paper, glass, metal and plastic.

Noise Pollution and Control

Sources of noise pollution, Units of Noise pollution measurement, Allowable limits for different areas, Problems of noise pollution and measures to control it.

Reference book:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering"; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunningham WP and MA; principles of Environment Sc; TMH
11. 11.Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011, Ane Books, Pvt. Ltd, New

List of Experiments

GROUP A AIR POLLUTION (Any one experiment may be selected from this group)

1. Air monitoring and determination of SPM, CO, Nox, SO₂ with high volume sampler.
2. Monitoring of stack gases and determination of SPM, CO, Nox, SO₂ with slack monitoring kit.
- 3 Determination of CO,HC, in exhaust gases from petrol vehicle

GROUP B NOISE POLLUTION

- 4 Determination of sound pollution in (a) Auditorium (b) Factories (c) Busy roads (d) Theatre (e) TV rooms (select any three situations)

GROUP C INDUSTRIAL WASTE WATER (Any Two experiment may be selected from this group)

- 5 Determination of BOD/COD ratio in industrial waste water.
- 6 Determination of Ph and alkanity/ acidity in industrial waste water.
- 7 Dermination of solids in industrial waste water.
- 8 Determination of turbidity, cobur,and temperature of industrial waste water.

GROUP D POLLUTION STANDARDS (Any Two experiment may be selected from this group)

- 9 Study of drinking water standards.
- 10 Study of effluent standards for water disposal.
- 11 Study of air pollution standards.

Unit 1: Fundamental Concepts:

- 1.1 Comparison between analog and digital signals.
- 1.2 Different types of number system and codes used in digital computer.

Unit 2: Logic Gates:

- 2.1 Basic Logic Gates: Logic symbols and truth table of all gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR
- 2.2 Realization of all other gates using universal gate.

Unit 3: Boolean algebra:

- 3.1 Rules and laws of Boolean algebra, Demorgan's theorem.
- 3.2 Evaluation of logic expression, algebraic reduction of Boolean

Unit 4: Combinational Logic Design:

- 4.1 Introduction to logic design
- 4.2 Karnaugh map representation of logical functions, Simplification of logical function using K-map, (2, 3, 4 variable) Sum of products (SOP) Product of Sum (POS)
- 4.3 Don't care conditions.
- 4.4 Design example: half adder, full adder, Half subtractor, full subtractor, BCD to seven-segment decoder (using k-map)
- 4.5 Gray to binary code converter (using kmap)
- 4.6 Universal Gate.

Unit 5: Combinational Logic Design Using MSI Circuits:

- 5.1 Multiplexer (2:1) demultiplexer (1:4), Decoder (3:8) encoder (8:3) using combinational logic design.
- 5.2 BCD adder, using (7483). ALU(74181). Digital comparator (7485), Parity generator/checkers(74180).
- 5.3 Code converters: BCD to binary(74184), Binary to BCD(74185A)
- 5.4 Priority encoder: Decimal to BCD(74147), Octal to binary priority encoder (74148), Hexadecimal to binary priority encoder using 74148 encoders.
- 5.5 Decoder/drivers for display device: BCD to decimal decoder/driver (7447, 7448)

Unit 6: Logic Families:

- 6.1 Digital integrated circuits, its introduction
- 6.2 Introduction: RTL, DTL, IIL, ECL, MOS families
- 6.3 Propagation delay time, speed, power consumption, fan_in , fan_out.
- 6.4 TTL and C-MOS logic families: Introduction

- 6.5 Analysis of open collector and tri-state logic, Input/output parameters, advantages, applications,
6.6 IC-interfacing, TTL driving CMOS, CMO driving TTL

Unit 7: Sequential Logic Circuit:

- 7.1 Introduction: One bit memory cell
7.2 Flip-Flop-S-R, Clocked RS, T,D, J-K, master slave , JK
7.3 Triggering of flip-flops, analysis of clocked sequential circuits, state reduction and assignment, Flip-flop excitation table, design procedures, design of counters, design with state equation. Working Principle and Truth-Table
7.4 Registers, shift registers. Working with SISO, SIPO, PISO, PIPO shift registers.
7.5 Counters: Ripple counters, synchronous and asynchronous counters, timing sequences, Ring and Johnson counter, application of counters, Counter 4 Bit

REFERENCES

- [1] Digital principles Malvino & Leach, Tata McGraw Publishing Company Ltd. New Delhi, Latest, 2000.
- [2] Modern Digital Electronics R.P.Jain, Tata McGraw Hill Publishing Company Ltd. New Delhi, 2nd Edition,2000.
- [3] Digital Electronics V.K. Puri Tata McGraw-Hill PublishingCompany Ltd. New Delhi, 1st Edition,2000.
- [4] Computer Design Latest & Digital Techniques Morris Mano, Tata MacGrawHills
- [5] Digital principles Malvino & Publishing Company Ltd. New Delhi, Latest, 2000
- [6] Modern Digital Electronics R.P.Jain, Tata McGraw Hill Publishing Company

List of Experiments

1. Study and verify the truth table of logic gates (74xx series).
2. Realization of AND, OR, NOT and Ex-OR logic gates using NAND and NOR gate
3. Verification of Demorgan's theorem
4. Implementation of full adder, subtractor using gates
5. Study of gray to binary code convertor using gates
6. Study to multiplexer and demultiplexers.
7. Implementation of combination logic circuit using Mux and Dmux.
8. Study of BCD adder
9. Study of BCD to seven segment decoder.
10. Verification of truth table of flip flop using IC's
11. Shift registers using D flip-flop
12. Presetable shift right, shift left registers.
13. Ripple counter using J-K flip flop
14. Decode counter 7490.
15. Synchronous counter using J-K flip-flops.
16. Up/down counter.
17. Mod N counter using J-K flip-flop
18. Study of 6116 RAM
19. Study of 2732 EPROM

Unit 1: Review of General Topics:

- 1.1 Atomic Structure of Conducting and Semi-Conducting materials.
- 1.2 Behavior of materials with electricity.
- 1.3 Concept of unit of Electric current and Voltage
- 1.4 Ohm's Law, Concept of Resistance, Conductance, Resistivity and Conductivity. Their units and dependence on temperature
- 1.5 Power & Energy, heating effect of electric current and conversion of units (Mechanical to Electrical)
- 1.6 Kirchoff's Voltage and current Laws & their applications in simple DC Circuits.
- 1.7 Series & Parallel combination of resistance and wattage, Consideration with Simple Problem.

Unit 2: Electromagnetism:

- Concept of magnetic field production by flow of current, concept of mmf, flux, reluctance, permeability, Analogy between electrical & magnetic circuits.
- 2.2 Faraday's Laws of electromagnetic induction, self and mutually induced emfs, simple numerical problems.

Unit 3: AC Theory:

- 3.1 Concept of alternating voltage and current, difference between AC and DC.
- 3.2 Concept of cycle, frequency, period, amplitude, instantaneous value, average value, r.m.s. value and peak value, form factor (definitions only.)
- 3.3 Concept of impedance, phase angle, numerical problems, RL & RLC series circuits

Unit 4: General Electrical Machines:

- 4.1 Introduction, definition of motor & generator and common features of static & rotating electrical machines.
- 4.2 Transformer- Construction- core type, shell type, transformation ratio and e.m.f equation.

Unit 5: Semiconductor Physics:

- 5.1 Conducting materials, effect of temperature conductivity in Germanium and Silicon.
- 5.2 Extrinsic Semi-Conductors, doping, P-N type Semi-Conductor, majority and minority carriers, effects of temperature.
- 5.3 P-N junction, drift and diffusion currents, depletion layer, potential barrier, effects of forward and reverse biasing of P-N junction. Energy band diagrams, breakdown mechanism.

Unit 6: Semi Conductor Diodes:

- 6.1 Use of diode as half wave and full wave (Centre tapped and bridge type) rectifiers. Relation between d.c. output and a.c. input voltage.

6.2 Concept of ripples, filter circuits, Shunt capacitor, Series inductor & filters and their applications.

6.3 Zener-diode and its V-I Characteristics.

Unit 7: Transistors:

7.1 Construction of bi-polar junction transistor with respect to :-

7.1.1 Working-principle of transistor, forward and reverse biasing.

7.1.2 Transistor Configuration-Common Base (CB), Common Emitter (CE) and Common Collector (CC), their Comparison of configuration and applications.
General introduction of UJT, FET and SCR.

Unit 8: Regulated Power Supply:

8.1 Need of regulated power supply, regulation, Block diagram of regulated power supply, stabilisation of voltage by Zener diode, its limitations.

8.2 transistorised regulated power supply and short circuit protection.

Unit 9: Measuring Instruments:

9.1 Working principle and Construction of Ammeters and Voltmeter, difference between them, extension of range and simple numerical problems.

9.2 Principle and working of Watt meter (dynamometer type) and Energy meter (static type)

9.3 Digital measuring instruments, Basic concepts of CRO.

References

1. Electronic Technology E.admirality
2. Electrical Engineering basic technology Hubscher, Klaue pfloger, Appelt, Willey Eastern Ltd, New Delhi
3. Electrical Engineering– J.B. Gupta
4. Experiments in basic electrical Engineering S.K. Bhattacharya, S.K. Rastogi International, New Delhi
5. Problems in Electrical Engineering Smith P., 1st, 1996,
6. A Text book of Applied Electronics R.S. Sedha, S. Chand & Co. New Delhi
7. Principals of Electronics Latest, V.K.Mehta, S.Chand Publication
8. Electronics Principles Malvino TMH
9. Electrical Technology B.L. Thereja , Chand Rai
10. Electronic Technology E.admirality

List of Experiments

1. Verification of Ohm's law
2. Verification of Kirchoff's law
3. Find out the value of capacitance of corrector
4. Plotting V-I Characteristics of semi-conductor diode.
5. Plotting V-I characteristics of Zener diode and finding its reverse breakdown voltage.
6. Observation of output wave shapes and input wave shapes of Full wave/Half wave rectifier.
7. Plotting input/output characteristics of CE configuration of transistor.
8. Measure voltage, current, power and energy in single phase AC circuit.
9. Color coding of resistance and units of capacitance.
10. Study of AC/DC Voltmeter
11. Study of AC/DC Ammeter
12. Study of AC/DC Wattmeter
13. Study of Digital Instruments and Displays
14. Study of Regulated Power Supply

Unit1: Tools and Accessories Used In Manufacturing of Electronic Circuits:

Different types of cutters, Nose pliers, Wire strippers, Screw drivers, Lead straightners, Extractors, Soldering Iron, Desoldering Pump, Crimping tool.

Unit 2: Basic Electronic Components:

Color coding of resistors and capacitors, Types of resistors, capacitors, inductors, Identification of components i.e., Diodes, Transistors, SCR, Transformers, Study and use analog multi to measure:

AC and DC voltage, AC and DC current, Different resistor, Continuity testing

Unit 3: Digital Multimeter:

Study and use digital multimeter to measure: AC and DC voltage, AC and DC current, Different resistor, Continuity testing

Unit 4: Function Generator:

Front panel controls and there uses, Frequency changer and amplifier.

Unit 5: CRO:

Front panel control and their functions, Different waveforms, Measurement of amplitude and frequencies

Unit 6: Different Cables & Connectors:

Co-axial cable, twisted pair cable, Flat ribbon cable, Fibre optic cable.

Unit 7: Different Connectors:

BNC connector, Banana connector, Crocodile connector, Male and female D type connector, Flat cable connector, Printed circuit connector, UTP connector

Unit 8: Different Switches:

Toggle switches-SPST, SPDT, DPST, DPDT, Thumb-wheel switches, Rotary switches, Push on/Push off switches, Keyboard switches-mechanical, capacitive, membrane, DIP switches

Unit 8: Different Display Devices:

LED display, seven segment display, LCD display

Unit 8: Preparing Cables and Boards:

Prepare computer network cable (use different type of cable and connectors stated as in chapter 6). Study and use bread boards to implement, simple electronic circuits using resistors/ capacitors/ diodes/ transistors/switches/display devices, Prepare two simple electronic circuits using general purpose PCBs. Prepare two PCBs for simple electronic circuits.

References

1. Zbar, P.B. Basic Electronics. A Text-Lab Manual, 7th Edition, TMH, 1995.
2. James M. Kirkpatrick, Electronic drafting and Printed Circuits board design, Galgotia Publisher, 1988.
3. Paul B. Zbar, Industrial Electronics, A Text – Lab Manual, 3rd Edition, TMH, 1983.

List of Experiments

1. Identify the various types of resistors and find out the values from color bands /written values on them and measure with multimeter.
2. Identify the (i) terminals of a diode and its polarity, (ii) zener, LED, Photodiode, IR diode (ii) terminals of a Transistor and its Type (n-p-n or p-n-p).
3. Identify and use different tools and accessories used in manufacturing of electronic circuits.
 - o Different types of cutters.
 - o Nose pliers
 - o Wire strippers
 - o Screw drivers
 - o strengtheners
 - o Extractors
 - o Soldering iron
 - o Desoldering pump
 - o Crimping tool
4. Identify the type of components(L,C,R) and find out the values using LCR- Meter
5. Identify the various waveforms of Function Generator using CRO. Measure Amplitude & Frequency for various waveforms using CRO.
6. Use regulated power supply and identify front panel controls and their functions.
7. Use DC and AC voltmeter and ammeter to measure DC and AC voltage current.
8. Use analog multi-meter to measure
 - AC and DC voltage
 - AC and DC current
 - Resistance of Different resistors
 - Continuity testing.
9. Use digital multi meter to measure:
 - AC and DC voltage
 - AC and DC current
 - Different resistor
 - Continuity testing.
10. Identify various kinds of electronic components

11. Use different switches
 - Toggle switches – SPST, SPDT, DPST, DPDT
 - Thumb-wheel switches
 - Rotary switches
 - Push on/Push off switches
 - Lead strengtheners
 - Extractors
 - Keyboard switches – mechanical, capacitive, membrane
 - DIP switches
12. Use different switches
13. LED display
14. Seven segment display
15. LCD display
16. Solder the joint connection of wires and components on a PCB and check it. De-solder it and Re-solder.
17. Prepare computer network cable (use different type of cable and connectors)
18. Use of breadboards to implement simple electronic circuits using resistors/capacitors/diodes/ transistors/switches/display devices.
19. Prepare two simple electronic circuits using general purpose PCBs.
20. Prepare two PCBs for simple electronic circuits.
21. Assemble circuit on breadboards and PCBs (e.g rectifiers, oscillators, amplifiers).

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).

C. Following grade scale of evaluation of performance in PA has been established.

Grades	Level of performance
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.

E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.

F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.

G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.

H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

I. Compendium shall contain following:

I. Record of written quiz.

II. Report/write up of seminar presented

III. Abstract of the guest lectures arranged in the Institution.

IV. Topic and outcome of the group discussion held.

V. Report on the problems solved through case studies.

VI. Report on social awareness camps(organized for social and environmental prevention).

VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.

Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.

Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.