RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER: SIXTH SCHEME : Jul.09
COURSE CODE: 611 PAPER CODE: 6215
NAME OF COURSE: COMPUTER PROGRAMMING
COMMON WITH PROGRAM (S): Electronics & Telecommunication

RATIONALE

The knowledge of programming languages is very essential for any technical student. In the development of computer programming, many languages have come, but the 'C' is the only language that is recognized very well in electronics, because this programming language is very near to machine language. Most of the available devices and microcontrollers are programmed via 'C'. That's why it is known as middle level language.

This practical based course is not only emphasizing on 'C' but also introducing other OOPs languages like C++ and java at very elementary level. So that the student will feel comfortable, whenever upgrade him/her self to other programming languages.

Upon completion of this course, the student will be able to:

- Write and run programs on C.
- Debug and familiarize the errors in program.
- Understand the flow of program as it run.
- Understand pointer and functions
- Understand elementary knowledge of C++ and Java.

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COURSE CODE: 611 PAPER CODE: 6215
NAME OF COURSE: COMPUTER PROGRAMMING
COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: **6** Hrs. per week
Practical: **2** Hrs. per week

SCHEME OF STUDIES

S.No.	TOPICS	THEORY (HRS)	PRACTICAL (HRS)	TOTAL (HRS)
1.	**PROGRAMMING CONCEPTS**	**6**	**2**	**8**
2.	**FUNDAMENTALS OF C**	**10**	**2**	**12**
3.	**OERATORS IN C**	**12**	**4**	**16**
4.	**CONTROL STATEMENTS**	**12**	**4**	**16**
5.	**FUNCTIONS**	**12**	**4**	**16**
6.	**ARRAY, STRING & POINTER**	**14**	**6**	**20**
7.	**BASICS OF STRUCTURE, UNION and FILES**	**12**	**4**	**16**
8.	**OTHER PROGRAMING LANGUAGE**	**12**	**4**	**16**
	TOTAL	**90**	**30**	**120**

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CONTENT DETAILS

Sr.no	Course content	Study of hours
01	**Introduction** program concept, Assembler, Compiler & Interpreter,characteristics of a good program,various stages in program development, Algorithms, Flowcharts, pseudo-codes, programming technique- top down, bottom-up, structured programming.	6
02	**Fundamentals of C** History & Features of C, C program structure, pre-processor directives, C tokens-character set, keywords, identifiers, constants, variables, data types, data types conversion, Expressions, Statements, Use of header files, Defining macros, input/output functions- printf(), scanf(), getchar(), putchar(), gets(), puts() etc. Formatted I/O using control string.	**10**
03	**Operators in C** Arithmetic Operators, Logical Operators, assignment operator, Relational Operators, Bitwise Operators, Special Operators: exp, exit(), sizeof(), increment and decrement (post and pre) operators-precedence & associativity, Type casting, C expression data type, order of evaluation of expression	06
04	**Control Statements** Loop statements: for statement, while statement, Do-while statement, break-continue statement, nested loop. Branching statements: if statement, if- else, nested if. Unconditional branching: goto statement Multiple branching statements: switch case statement.	18
05	**FUNCTIONS** Basics of function, types of C Functions, Bindings of function, parameters of functions, local and global variables. **User-defined Functions** - Function declaration, Function prototype, scope and life of variable-actual, formal, call by value, call by reference. Implementations, Accessing a Functions, Arguments and Parameter passing mechanisms, recursion, Storage classes – static auto, extern, and register. **built-in function:** declaration, Accessing, Parameter passing.	12

Sr.no	Course content	Study of hours
06	**ARRAY, STRING & POINTER** **Array** Concept of one dimensional and Multi-dimensional array, array declaration, Array initialization, operations on one and two-dimensional arrays. **String Manipulations** Strings, gets(), puts(), string operations, string function (concatenation, comparison, length of a string etc.) **Pointers** Definition, Types, Declaration, & and * operator, pointer expression, pointer arithmetic, pointer to pointer, array of pointer, pointer to function. Dynamic memory management -malloc(), calloc() and free.	14
07	**BASICS OF STRUCTURE, UNION and FILES** **Structure:** Definition, Declaration, initializing structure, membership operator, accessing structure elements Union:- Definition, Declaration and Implementations **File handling:** File system basics, Opening & closing file, Reading & writing in file, File opening modes, String I/O in files.	12
08	**OTHER PROGRAMING LANGUAGES:** Basic Concepts Of Object Oriented Programming, Classes and Objects, Inheritance, Polymorphism, Abstraction, Encapsulation, Dynamic Binding, Message Passing, Fundamental Understanding and programming of C++, Characteristics and Features of C++, Difference between C and C++, Applications of C++, Fundamental Understanding and programming of Java, Characteristics and Features of Java, Applications of Java, Difference between C++ and Java.	12

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COMMON WITH PROGRAM (S): Electronics & Telecommunication

Practical: **2** Hrs. per week

LIST OF EXPERIMENTS

S.No.	Name of Experiment	Hrs of Practical
1	Working with turbo C editor	30 Hrs
2	Program using printf() scanf() and formatted I/O, string manipulations.	
	Defining and using Macros	
3	Program using Operators	
4	Program using various Control Statements	
7	Program using Single dimensional and Two-dimensional array.	
8	Program using Functions.	
9	Program using call by Value & Call by reference	
10	Program using Static, Auto, & Extern function.	
11	Program using Structure &Union.	
12	Program using Pointers & Files.	
13	Program to print hello using classes in c++	
14	Program to print hello in java.	
16	Program to learn, to write assembly language in C	
15	One Small Project must be develop in C & C++ language	

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NAME OF COURSE: COMPUTER PROGRAMMING
COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: **6**Hrs. per week
Practical: **2**Hrs. per week

REFERENCES

Text Book:

1. Programming in C, Balaguruswami
2. Let us C, Y. Kanetker

Further Readings:

1. Theory and problems of programming with 'C', Gottfried., Schaum's series
2. Chapman, Understanding windows, BPB Publication
3. C: the complete reference, Herbert schildt,4 edition, McGraw-Hill Osborne Media
4. Complete reference of C++,
5. Programming in C++, Balaguruswami
6. Complete reference of JAVA

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DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER: SIXTH SCHEME : Jul.09
COURSE CODE: 601 PAPER CODE: 6405
NAME OF COURSE: MICROPROCESSOR AND MICROCONTROLLER

COMMON WITH PROGRAM (S):

RATIONALE

This course is designed to focus on architecture and programming of 8-bit and 16-bit Microprocessors, Microcontrollers and to study how to interface various peripheral devices with them.

OBJECTIVE

- To study the architecture and Instruction set of 8085 and 8086
- To develop assembly language programs in 8085 and 8086.
- To design and understand multiprocessor configurations
- To study different peripheral devices and their interfacing to 8085/8086.
- To study the architecture and programming of 8051 microcontroller.

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DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER: SIXTH SCHEME : Jul.09
COURSE CODE: 601 PAPER CODE: 6405
NAME OF COURSE: MICROPROCESSOR AND MICROCONTROLLER

COMMON WITH PROGRAM (S):

Lectures: **4** Hrs. per week
Practical: **2** Hrs. per week

SCHEME OF STUDIES

S.No.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS.)	TOTAL (HRS)
1.	8085 Microprocessor	10		
2.	8086 Microprocessor	10		
3.	8086 System Design	10		
4.	I/O Interfacing	10		
5.	Microcontrollers	12		

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SEMESTER: SIXTH SCHEME : Jul.09
COURSE CODE: 601 PAPER CODE: 6405
NAME OF COURSE: MICROPROCESSOR AND MICROCONTROLLER

COMMON WITH PROGRAM (S):

Lectures: **4** Hrs. per week

CONTENT DETAILS

S.No.	Course Contents	Hrs of Study
01.	8085 MICROPROCESSOR Introduction to 8085 – Microprocessor architecture – Instruction set : hexadecimal code & mnemonics – Code conversion.	10
02.	8086 MICROPROCESSOR Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines (Programming not required).	10
03.	8086 SYSTEM DESIGN 8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations – System design using 8086	10
04	I/O INTERFACING Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.	10
05	MICROCONTROLLERS Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.	12

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NAME OF COURSE: MICROPROCESSOR AND MICROCONTROLLER

COMMON WITH PROGRAM (S):

Practical: **2** Hrs. per week

LIST OF EXPERIMENTS

S.No.	Name of Experiment	HRS OF PRACTICAL
1	Using 8085/8051 kit Perform the : • Addition, Subtraction • Multi-byte addition • Multiplication of two numbers • Finding the maximum value in an arry • Arranging the given data in Ascending order • BCD to Hex conversion • Hex to BCD conversion • Hex to ASCII • ASSCII to Binary • Square Root of an given data • Least Common Multiple • Greatest Common Divisor	**30**
2	Study of 8086 kit /Assembler Software with example programmes.	

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NAME OF COURSE: MICROPROCESSOR AND MICROCONTROLLER

COMMON WITH PROGRAM (S):

REFERENCES

S.No.	TITLE	Author Publisher & Address	ISBN No.
1.	Microprocessor architecture programming and application with 8085	Ramesh S. Gaonkar	8085/ 8080A
2.	8051 Microcontroller	Kenneth Ayala	
3.	Advanced Microprocessors and peripherals – Architectures,	Ray and Bhurchandi	
4.	Advanced Microprocessors & Interfacing	B. Ram, TMH	
5.	Introduction to Microprocessor	Aditya P. Mathur	
6.	8051 Microcontroller and assembly language programming	Mazidi	
7.	Microcontrollers Theory and Applications	Ajay V Deshmukh, McGraw Hill Education	
8.	Programming and Customising the 8051 microcontroller	Myke Predko, McGraw Hill Education	
9.	Solid state circuit design with Microcontrollers	C.K. Dwivedi (Das Publisher)	
10.	Microprocessor & Interfacing	Dougus V. Hall	
11.	Microcomputer systems : The 8086/8088 Family architecture Programming and Design	Yu-cheng Liu, Glenn A. Gibson, PHI 2003	

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DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER: SIXTH SCHEME : Jul.09
COURSE CODE: 603 PAPER CODE: 6244
NAME OF COURSE: ENERGY CONSERVATION AND MANAGEMENT
COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: **06** Hrs. per week

RATIONALE

Electrical Engineering without the knowledge of energy conservation & management is imperfect. In the era of Globalization and Liberalization, this course of Energy Conservation & Management is utmost important to the entrepreneurs and industrialists. Energy audit is going to be mandatory by Govt. of India. This course is specially designed to help the students in widening their knowledge and also helpful to start their career in energy auditing field. Energy saving is also very relevant to the cost competition.

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COURSE CODE: 603 PAPER CODE: 6244

NAME OF COURSE: ENERGY CONSERVATION AND MANAGEMENT

COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: **06** Hrs. per week

SCHEME OF STUDIES

S.No.	Topics	Theory Hrs.
1.	Energy scenario	10
2.	Energy management and audit	12
3.	Waste heat recovery	12
4.	Heating, ventilation and air-conditioning	10
5.	Role of maintenance in energy conservation	8
6.	Demand side management	10
7.	Energy efficient motors and drives	12
8.	Energy conservation in various sectors and co-generation	10
9.	Economic analysis of energy conservation	6
	Total	90

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NAME OF COURSE: ENERGY CONSERVATION AND MANAGEMENT
COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: **06** Hrs. per week

COURSE DETAILS

S.No.	COURSE CONTENT	
1.	Energy Scenario- Various types of renewable and non-renewable energy, energy consumption and use pattern, energy consumption and environment.	10
2.	Energy Management and audit-Energy Management and its objectives, energy audit, need of energy audit, types of energy audit, energy auditing instruments.	12
3.	Waste heat recovery-Sources of waste heat, advantages of waste heat recovery, commercial waste heat recovery devices-Recuperators, Heat regenerators, heat pumps etc. Agricultural use of waste heat.	12
4.	Heating ventilation and air conditioning-Definition of Heating, ventilation and air conditioning, Energy saving opportunities in Heating ventilation and air conditioning, Conducting Audit in Heating ventilation and air conditioning.	10
5.	Role of maintenance in energy conservation-Types of maintenance-breakdown, predictive & preventive, maintenance and energy conservation.	8
6.	Demand side management –Benefits, Demand side management Techniques, implementation of Demand side management programme, Tariff options of Demand side management.	10
7.	Energy efficient motor and drives-Motor efficiency, energy efficient motors, energy efficient electric drives, use of variable speed drives. Power factor improvement-Causes of low power factor,	12

	advantages of power factor improvement, methods of power factor improvement.	
8.	Energy conservation in various sectors- - For residential and commercial sector - in transportation - in energy intensive industries. Co-Generation - benefits, types of co-generation.	10
9.	Economic Analysis of energy conservation-Economic analysis of investment, Economic analysis techniques, Risk analysis.	6

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COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: **06** Hrs. per week

REFERENCES

S. No.	Name of Book
1 2 3 4	Energy Conservation and Management by S. K. Soni and Manoj Nair, Satya Prakashan, New Delhi Energy management- W.R.Murphy & G.M. ckey, Butter worths Electrical Energy utilization & conservation – Dr. S.C.Tripathi . Four books published by BEE (Bureau of Energy Efficiency) Govt. of India

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DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER: SIXTH SCHEME : Jul.09
COURSE CODE: 612 PAPER CODE: 6216
NAME OF COURSE: PROGRAMMABLE LOGIC CONTROLLERS
COMMON WITH PROGRAM (S): Electronics & Telecommunication

RATIONALE

Modern Industrial environment is guided with the latest technological advancement in computers and communication. Programmable Logic Controllers based automation is the out come of that.

In view of keeping industrial automation a technician play an important role in maintaining normal working of control system. It is also necessary that a technician must understand modern control devices and schemes.

The curriculum has been designed to meet the requirements of a technician engineer, so that he can skillfully handle the problems of industrial automation and control system. The contents included in the subject are kept at level to develop proper skills, knowledge and attitude suiting to the job requirement.

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NAME OF COURSE: PROGRAMMABLE LOGIC CONTROLLERS
COMMON WITH PROGRAM (S): Electronics & Telecommunication

Lectures: 6 Hrs. per week
Practical: **2** Hrs. per week

SCHEME OF STUDIES

S.No.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS.)	TOTAL (HRS)
1.	Introduction to PLC	9	2	11
2.	PLC Hardware, Timers &Counters	18	6	24
3.	Advance Instruction & Programming Techniques	18	4	22
4.	PLC Input-Output (I/O) Modules Power Supply	18	4	22
5.	PLC Applications	15	6	21
6.	Industrial Automation & Selection of Programmable Logic Controllers	12	8	20
	TOTAL	90	30	120

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Lectures: 6 Hrs. per week
Practical: **2** Hrs. per week

CONTENT DETAILS

Sr.no	Course content	Study of hours
01	Introduction to PLC- 1.1 What is PLC ,Technical Definition of a PLC 1.2 Advantage of PLC 1.3 Chronological Evolution of a PLC 1.4 Type of PLC 1.5 Block diagram PLC	09
02	PLC Hardware, Timers &Counters- 2.1 Relays 2.2 Ladder logic diagram 2.3 PLC Connection 2.4 Electrical Wiring diagram 2.5 JIC Wiring Symbols 2.6 Latches,Timer 2.7 Classification of Timer 2.8 PLC Counters 2.9 Operation of PLC Counter 2.10 Counter Parameters	**18**
03	Advance Instruction & Programming Techniques- a. Introduction b. Comparison Instruction c. Discussions on Comparison Instruction i. "EQUAL" i. "NOTEQUAL" i. "LESS THEN" v. "LESS THEN OR EQUAL" v. "GRATER THEN" i. "MASKED COMPARISION FOR EQUAL"	18

Sr.no	Course content	Study of hours
	i. "LIMIT TEST" d. Mathematical Instruction e. Logical Instruction Data handling Instruction	
04	PLC Input-Output (I/O) Modules Power Supply Introduction Classification of Input Output Modules Input-Output System Sinking Sourcing Special Input Modules RTD Input Module Stepper Motor Control Module Thermocouple Input Module Power Supply Configuring Power Line conditioner Reliability, Safety and Redundancy Filter	18
05	PLC Applications- Distributed control system, (DCS Industrial control systems, (ICS) Programmable automation controller, (PAC). Industrial safety systems SCADA	15
06	Industrial Automation & Selection of Programmable Logic Controllers- Introduction Utility of automation Example of some simple Automated Systems Selection of PLC	12

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Practical: **2** Hrs. per week

LIST OF EXPERIMENTS

S.No.	Name of Experiment	Hours of Study
1	Develop a Simple Ladder Logic Program that will turn on an output X if input A and B or C is on	30
2	Develop a relay based Controller that will allow three switches in a room to control a single light	
3	How temperature control system can be developed in a process industry	
4	Develop a traffic control System	
5	Speed control of Induction Motor	

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REFERENCES

1. PLC Programming Method and Application :-
   -John R Hackworth
   - Fredric D Hackworth
   (publication:- Pearson Education)

2. Process Dunamic and control
   -D.E.seborg
   -T.F.Edgar
   -D.A.Melichamp
   (publication:-Wiley publication)

3. Programmable Controllers operation and Application
   (publication :-PHI publication)

4. Programmable Logic Controllers and Industrial Automation an Introduction
   By:- Madhuchanda Mitra and Samarjit Sen Gupta
   (publication:-Penram International Publishing (India) Pvt.Ltd.

5. Programmable Logic Controllers
   By:-W. Bolten
   Programmable Logic Controllers and Industrial Automation
   By:- Kelvin Collins
   (publication:-Exposure Publishing)

6. Programmable Logic Controllers
   By:-Collin Simpson
7. Programmable Logic Controllers
   By:-Morriss Brian publication :-PHI