DELHI SKILL AND ENTREPRENEURSHIP UNIVERSITY

DSEU

Diploma in Computer Engineering

Syllabus Document

EFFECTIVE FROM ACADEMIC YEAR 2021-22

Program Vision

The vision of Diploma in Computer Engineering is to impart knowledge and practical expertise to empower students with new technologies in the field of Computer Engineering. This course has been designed to include specialized fields for current and futuristic demands of the IT industry. Apart from IT skills, students will get multiple opportunities to enhance their personalities and focus to handle life challenges smoothly and practice good hobbies.

Program Outcome

- To develop skilled computer engineering professionals with innovative attitude
- Students will have great and long vision careers in computer engineering fields or will be able to successfully pursue advanced degrees
- To inculcate mind set towards Entrepreneur

a. Technical Knowledge/Skills: HTML, JavaScript, PHP, XML, Flutter, AJAX, Python.
b. Software Skill and Project Skills: Programming skill & Software management Skill in PHP, Android, .NET, Cloud, Java, Advance Java Programming, MySQL.
c. Personality Traits and Ethics: Assertiveness, Good attitude, Compassionate, Patience, Punctuality, and Sincerity
d. Soft Skills: Flexibility and adaptability, work ethics, Responsibility, Good Verbal, written and communication Skills, Interpersonal Skills.

Credit Scheme

		Semester I				
SI No.	**Subject Code**	**Course Titles**	**Hours/week**			**Total Credits**
			L	**T**	**P**	
1	CS-HS101	Face The World (FTW) Skills I	-	-	-	3
2	CS-HS102	English Communication I	2	0	0	2
3	CS-HS103	Sports & Yoga	0	0	2	1
4	CS-FC101	Applied Mathematics - I	3	1	0	4
5	CS-FC102	Basic Electrical & Electronics Engineering	3	0	4	5
6	CS-FC103	Basic Engineering Graphics	0	0	6	3
7	CS-AU101	Workshop Project	0	0	2	1
8	CS-PC101	IT Skills & Technology	2	0	4	4
		TOTAL	**10**	**1**	**18**	**23**

NOTE- Syllabus for FTW Skills- I, English Communication- I, Sports and Yoga, Applied Mathematics- I, Basic Engineering Graphics and Workshop Project are given separately.

		Semester II				
S. No.	**Subject Code**	**Course Titles**	**Hours/week**			**Total Credits**
			Lecture	**Tutorial**	**Practical**	
1.	CS-HS201	Face The World (FTW) Skills II	-	-	-	1
2	CS-HS202	English Communication II	0	0	2	1
3	CS-FC201	Applied Mathematics II	3	1	0	4
4	CS-FC202	Applied Physics	2	0	2	3
5	CS-PC201	Programming in C	3	0	3	4.5
6	CS-PC202	Digital Electronics	3	0	2	4
7	CS-PC203	Microprocessor	3	0	3	4.5
		TOTAL	**14**	**1**	**12**	**22**

NOTE- FTW Skills II, English Communication II, Applied Mathematics II and Applied Physics are given separately.

SEMESTER I

IT Skills And Technology		
Semester I		
Course Code:	CS-PC101	
Course Title:	IT Skills & Technology	

Rationale:

Developing these skills will allow students to feel confident in using emerging technologies and students will become faster in finishing tasks. For example, IT skills will allow students to save money and time as students will be able to handle digital documentation and presentations online or offline.

Course Objective:

This course is intended to make new students comfortable with computing environment – Learning basic computer skills, learning basic application software tools, Understanding Computer Hardware, Idea of Algorithms and Flowcharts, Basic Concepts of Data, Information Technology, Data Science and Cloud Computing, Cyber security awareness

Learning Outcome:

At the end of the course students will be able to comfortably work on computers, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/ attacks online/offline.

Course Content:

Unit	Title	Hours
Fundamentals of Information Technology Skills	Definition of Information Technology. Application of Information Technology, difference between Data and Information, Concept of Data Science, Concept of Algorithm and Flowchart	2
Fundamentals of Internet and Networking	Basic Internet skills: Concept of Networking, Understanding web browser, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. Concepts of Cloud, Google Drive, Email, WWW, HTTPS, FTP, Gateway, Concepts of Client and Server, Basics of HTML.	2
Basics of Computer and its component	General understanding of various computer hardware components – CPU, Memory, Display, Keyboard, Mouse, HDD and other Peripheral Devices. Application Software vs. System Software, Firmware	3
Open Office Word	Office Tools: OpenOffice Writer, Document preparation using word processing software: Purpose and	5

	characterisation of documents, spell checking, mail merge, paragraph and page layout, alignment and justification, tables, charts. graphs, diagrams	
Open Office Spreadsheet	OpenOffice Spreadsheet (Calc), Concept of Spreadsheet: handling using spreadsheets formulae, Graphs and Charts.	5
Open Office Powerpoint	Open Office Impress. Document Presentation Using Powerpoint: preparation of slides and its presentation, hyperlinks.	4
Concepts of Database	Information Storage and Material: creating, editing and viewing database, adding, deleting and undeleting records, searching a database, ordering the database, on a selected key.	3
Online Platform Study	Understanding of various online platforms for attending online sessions like Zoom, google classroom, webinar etc.	2

Zsa

1. Browser features, browsing, using various search engines, writing search queries.
2. Visit various e-governance/Digital India portals, understand their features, services offered.
3. Read Wikipedia pages on computer hardware components, look at those components in the lab, identify them, recognise various ports/interfaces and related cables, etc.
4. Connect various peripherals (printer, scanner, etc.) to the computer, explore various features of the peripheral and their device driver software.
5. Explore features of Open Office tools, create documents using these features, do it multiple times.

A) **WORD Application:**
- File Management:
  Opening, creating and saving a document, locating files, copying contents in some different file(s)
- Page Setup:
  Setting margins, tab setting, ruler, indenting
- Editing A Document:
  Entering text, cut, copy, and paste using toolbars.
- Formatting A Document:
  Using different fonts, changing font size and color, changing the appearance through bold/italic/underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods.
- Aligning of text in a document, justification of document, inserting bullets and numbering.
- Formatting paragraph, inserting page breaks and column breaks.
- Use of headers, footers: inserting footnote, endnote, use of comments
- Inserting date, time, special symbols, importing, graphic images, drawing tools
- Tables and border:

Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table.

- Print preview, zoom, page setup, printing options
- Using find, replace options
- Using tools like:
Spellchecker, help, use of macros, mail-merge, thesaurus word content and statistics, printing envelopes and labels
- Using shapes and drawing toolbar
- Working with more than one window in MS-WORD
- How to change the version of the document from one window OS to another
- Conversion between different text editors, software and MS-WORD

B) **EXCEL APPLICATION**
- Starting excel, open worksheet, enter, edit, data, formulas to calculate values, format data, create chart, printing chart, save worksheet, switching from another spreadsheet
- Menu Commands:
Create, format charts, organize, manage data, solving problems by analysing data, and exchange with other applications. Programming with MS-excel, getting information while working
- Work books:
Managing work books (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations, working with arrays.
- Editing a worksheet, copying, moving cells, pasting, inserting, deleting cells, rows columns, find and replace text, numbers of cells, formatting worksheet.
- Creating a chart:
Working with chart types, changing data in charts, formatting a chart, and using charts to analyze data.
- Using a list to organize data, sorting and filtering data in list

C) **ACCESS Application:**
- Creating a database; table; the table window in design view, defining fields, primary key fields, planning the table
- Using datasheet view and designed view, modifying the design of a table, making a backup copy**.**
- Adding and editor: The access editor, adding and modifying records, moving data among records, adding sample data
- Finding records:
- Finding options, finds using wild card, find and replace

D) **Powerpoint Application:**
- Preparing presentation: Creating a new slide, sorting slides, inserting pictures, setting header and footer
- Formatting: Setting fonts, alignments, slide design, slide layout

- ● Slide show: View show, Rehearse timing, action buttons, slide transition, animations skills

6. Practical exercises on online sessions.

Teaching Approach:

Lectures, PowerPoint presentations, classroom practical, online tutorials.

References:

1. Computer Fundamentals, R.S. Salaria, Khanna Publishing House.
2. PC Software Made Easy – The PC Course Kit, Ramesh Bangia, Khanna Publishing House.
3. Fundamental of computer- V. Rajaraman
4. MS-Office 2007 for every one-Sanjay Saxena
5. Computer Fundamentals-P.K. Sinha

Open Source/Online Resources:

1. Website link https://spoken-tutorial.org

2. Tutorial on Google Classroom.

Basic Electrical and Electronics Engg	
Semester I	
Course Code:	CS-FC102
Course Title:	Basic Electrical & Electronics Engg.

Rationale:

The objective of the course is to impart basic knowledge and skills regarding basic electrical engineering, which diploma holders will come across in their professional life. This course will provide the students to understand the basic concepts and principles of
d.c. and a.c. fundamentals, electromagnetic induction, batteries, transformers, motors distribution system, domestic installation, electrical safety etc. The students will also learn basic electronics including diodes and transistors and their applications.

Course Objective:

The objective of the course is to understand the fundamental concepts and techniques used in electrical and electronic systems, understand the concept of measurement and analysis of various electronic circuits , measuring instruments and analyse implementation of circuits and do synthesis using various working principles.

Learning Outcome

After undergoing the subject, the students will be able to

• Understand the meaning of basic electrical quantities such as voltage, current, power etc.
• Use the working principle of the transformer.
• Use basic Network Theorem and Kirchhoff's laws.
• Understand the concept of Junction Diode, transistor and field effect transistor.

Course Content:

Unit	Title	Hours
DC Circuits	Elementary Concepts of Electric Circuits : Introduction of Circuit parameters and basic terminology : Voltage, Current, Power, Resistance, EMF, Resistances in series and parallel, Current and Voltage Division Rules. Analysis of DC electric circuits: Capacitors & Inductors: V-I relations and energy stored. Ohm's Law and Kirchhoff's laws-Problems, Star-delta conversion (resistive networks only-derivation not required)-problems. Mesh and Nodal analysis, Matrix representation with numerical	7
AC Circuits	AC Fundamentals, Phasor representation, Steady state, Inductive and capacitive reactance, concept of impedance. Analysis of RL, RC and RLC series circuits-active, reactive and apparent power. Simple numerical problems. Three phase AC systems: Generation of three phase voltages; advantages of	7

	three phase systems, star and delta connections (balanced only), relation between line and phase voltages, line and phase currents with numerical problems.	
Magnetic circuits	Fundamentals of Magnetic circuits: Basic Terminology: MMF, field strength, flux density, reluctance - comparison between electric and magnetic circuits- Series and parallel magnetic circuits with composite materials. Electromagnetic Induction: Faraday's laws, Lenz's law- statically induced and dynamically induced, Coefficient of coupling, representation of sinusoidal waveforms: frequency, period, Average, RMS values and form factor of waveforms-Numerical Problems. Introduction to electrical AC & DC Machines: Principles of operation and applications.	7
Transformers & Semiconductor Devices	Single phase transformers: Construction, principle of working, e.m.f equations, voltage and current ratios. Introduction to Semiconductor devices: Evolution of electronics – Vacuum tubes to nano electronics. Resistors, Capacitors and Inductors (constructional features not required): types, specifications. Standard values, color coding. PN Junction diode: Principle of operation, V-I characteristics, principle of avalanche breakdown. Bipolar Junction Transistors: PNP and NPN structures	8
Electronic Circuits	Basic electronic circuits and instrumentation: Rectifiers and power supplies: Block diagram description of a DC power supply, Working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response, Concept of voltage divider biasing	6
Communication systems	Introduction to Communication Systems: Evolution of communication systems – Telegraphy to 5G. Radio communication: principle of AM & FM, frequency bands used for various communication systems, block diagram of superheterodyne receiver, Principle of antenna – radiation from accelerated charge. Mobile communication: basic principles of cellular communications, principle and block diagram of GSM.	4

List of Practical:

1. Introduction to active and passive components. Circuit control and protective devices. Voltage and current source.
2. Familiarization with operation of following instruments
   a. Multimeter
   b. C.R.O.
   c. Signal Generator
   d. Regulated Power Supply
3. Verification of Kirchoff's Current Law and Voltage Law in a DC Circuit.
4. Prove the series combination of Resistance Req= R1-----------
5. Prove the parallel combination of Resistance 1/Req+-----------

6. Plot V-I Characteristics for P-N Junction diode & Zener diode
7. Observe the wave shape of following rectifier circuits
   (a) Half Wave rectifier
   (b) Full Wave rectifier
   (c) Bridge rectifier
8. Measure the voltage gain input output impedance in single stage CE amplifier circuit
9. Study the principle of AM & FM

Note: Above experiments may be done on Breadboards/ digital kits/ simulators as per requirement.

Teaching Approach:

The teacher should give emphasis on understanding the concept and various terms used in the subject. Practical exercises will reinforce various concepts.

References:

1. D P Kothari and I J Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D C Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
3. ChinmoySaha, Arindham Halder and Debarati Ganguly, Basic Electronics - Principles and Applications, Cambridge University Press, 2018.
4. Del Toro V, "Electrical Engineering Fundamentals", Pearson Education.
5. T. K. Nagsarkar, M. S. Sukhija, "Basic Electrical Engineering", Oxford Higher Education.
6. V. N. Mittle and Arvind Mittal, "Basic Electrical Engineering," Second Edition, McGraw Hill.
7. Parker and Smith, "Problems in Electrical Engineering", CBS Publishers and Distributors.
8. S. B. Lal Seksena and Kaustuv Dasgupta, "Fundamentals of Electrical Engineering", Cambridge University Press.

Open Source/Online Resources:

1. *https://www.youtube.com/watch?v=hW29oySEB3c*
2. *https://www.youtube.com/watch?v=__O_8rqXecU*
3. *https://www.tutorialspoint.com/basic_electronics/basic_electronics_pdf_version.htm*

SEMESTER II

Programming in C	
Semester II	
Course Code:	CS-PC201
Course Title:	Programming in C

Rationale:

In order to enable the students to use the computers in problem solving using C Programming. This course offers the programming language along with exposure to develop system programs or application programs. The knowledge of C language will be reinforced by the practical exercises.

Course Objective:

This course is intended to give know-how knowledge of C programming in length and breadth. The discipline of computing, understand fundamentals of programming such as variables, conditional and iterative execution, arrays, etc. and should be able to use the C compiler to create, debug and run simple C programs.

Learning Outcome:

After undergoing the subject, the students will be able to:

- Identify the problem and formulate an algorithm for it.
- Identify various control structures and implement them.
- Identify various types of variables.
- Use pointers in an array and structure.
- Use structures and unions for handling data.
- Explain the concepts of the C programming language.
- Explain and implement the language constructs concepts.
- Install C software on the system and debug the programme.
- Explain and execute member functions of C in the programme.
- Describe and implement array concepts in C programmes.
- Describe and execute pointers.
- Expose File System using File Handling

Course Content:

Unit	Title	Hours
Introduction to C Programming	Features of C and its Basic Structure, Simple C programs, Constants, Integer Constants, Real Constants, Character Constants, String Constants, Backslash Character Constants, Concept of an Integer and Variable, Rules for naming Variables and assigning values to variables.	2
Operators and Expressions	Arithmetic Operators, Unary Operators, Relational and Logical Operators, The Conditional Operator, Library Functions, Bitwise	2

	Operators, The Increment and Decrement Operators, The Size of Operator, Precedence of operator	
Data Types and Input/ Output Operators	Floating-point Numbers, Converting Integers to Floating-point and vice-versa, Mixed-mode Expressions, The type cast Operator, The type char, Keywords, Character Input and Output, Formatted input and output, The gets () and puts () functions, Interactive Programming.	2
Control Statements and Decision Making	The goto statement, The if statement, The if-else statement, Nesting of if statements, The conditional expression, The switch statement, The while loop, The do…while loop, The for loop, The nesting of for loops, The break statement and continue statement.	4
Arrays and Strings	One Dimensional Arrays, Passing Arrays to Functions, Multidimensional Arrays, Strings	3
Pointers	Basics of Pointers, Pointers and One-dimensional Arrays, Pointer Arithmetic, Pointer Subtraction and Comparison, Similarities between Pointers and One-dimensional Arrays, Null pointers, Pointers and Strings, Pointers and two-dimensional arrays, Arrays of Pointers.	3
Structures and Unions	Basics of Structures, Arrays of Structures, Pointers to Structures, Self-referential Structures, Unions.	2
Functions	Function Philosophy, Function Basics, Function Prototypes, and Passing Parameters: Passing Parameter by value and Passing Parameter by reference, passing string to function, Passing array to function, Structures and Functions Recursion	4
Storage Classes	Storage Classes and Visibility, Automatic or local variables, Global variables, Static variables, External variables	2
File Management	Defining and Opening a file, Closing Files, Input/output Operations on Files, Predefined Streams, Error Handling during I/O Operations, Random Access to Files, Command Line Arguments.	2

List of Practical:

1.Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetic, logical and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation.
5. Programming exercises on formatting input/output using printf and scanf and their return type values.
6. Programming exercises using if statements.
7. Programming exercises using if – Else.
8. Programming exercises on switch statements.
9. Programming exercises on while and do – while statement.
10. Programming exercises on for – statement.
11. Simple programs using functions and recursive functions.
12. Programs on a one-dimensional array.
13. Programs on a two-dimensional array.
14. (i) Programs for concatenation two strings together.
(ii) Programs for comparing two strings.
15. Simple programs using pointers.
16. Simple programs using structures.

17. Simple programs using union.
18. Simple programs for File Handling

Teaching Approach:

The subject is totally practical based. Students should be given clear ideas about the basic concepts of programming. In the practical session students should be asked to draw a flow chart, write an algorithm and then write a program for the algorithm and run it on the computer. It is required that students should maintain records (files with outputs).

References:

1. Let us C by Yashwant Kanetkar.
2. Programming in C by Gottfried, Schaum Series, , Tata McGraw Hill Education Pvt Ltd , New Delhi
3. The C Programming Language Kernighan & Ritchie
4. Computer system & Programming in C by Amit K. Mishra
5. Exploring C by Yashwant Kanetkar; BPB Publications, New Delhi

Open Source/Online Resources:

1. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.
2. http://swayam.gov.in,http://spoken-tutorial.org

Digital Electronics	
Semester II	
Course Code:	CS-FC202
Course Title:	Digital Electronics

Rationale:

The objective of this course is to make students understand various digital systems, fundamental principles of different electronic circuits and gain familiarity with the available IC chips. This subject aims to give a background in the broad field of digital systems design and microprocessors.

Course Objective:

The objective is to acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits and to prepare students to perform the analysis and design of various digital electronic circuits.

Learning Outcome

After undergoing the subject, student will be able to:
• Explain the importance of digitization.
• Realize all the logic gates using different methods.
• Realize all logic functions with universal gates : NAND and NOR.
• Design and interpret the truth tables of various Combinational and Sequential circuits.
• To understand and examine the structure of various number systems and its application in digital design.
• To develop skill to build, and troubleshoot digital circuits

Course Content:

Unit	Title	Hours
Introduction	Introduction to Digital & Analog Systems: Fundamental Concepts, Digital Waveforms, Logic Systems, Combinational and Sequential Logic Functions, Programmable Logic, Fixed-Function Logic Devices.	2
Number systems	Number system and Code: Standard representation in different number system : Binary, Decimal, Octal , Hexadecimal and its conversion, Number system codes: BCD code, Digital Codes -Excess-3 code, Gray code, Binary to Excess -3 code conversion and vice versa , ASCII code, EBCDIC code , Error Detection Codes.	3
Logic Gates	Logic Gates: Logical Operators, Logic Gates-Basic Gates, Other gates, Active high and Active low concepts, Universal Gates and realization of other gates using universal gates, Gate Performance Characteristics and Parameters.	3
Boolean Algebra	Rules and laws of Boolean algebra, De Morgan's Theorems, Boolean Expressions and Truth Tables, Standard SOP and	3

	POS forms, Canonical representation of Boolean expressions, Duality Theorem, Simplification of Boolean Expressions, Minimization Techniques for Boolean Expressions using Karnaugh Map .	
Combinational Logic Circuits	Combinational Logic Circuits- Introduction to combinational Circuits, Adders-Half-Adder and Full-Adder, Subtractors- Half and Full Subtractor; Parallel adder and Subtractor; Ripple Carry and Look-Ahead Carry Adders. BCD adder, BCD subtractor, Parity Checker/Generator, Multiplexer, Demultiplexer, Encoder, Priority Encoder; Decoder ,BCD to Seven segment Display Decoder/Driver, LCD Display, and Comparators.	6
Sequential Logic Circuits	Sequential Circuits: Introduction to Sequential Circuits, Flip-Flops: Types of Flip Flops -RS, T, D, JK; Triggering of Flip Flops; Flip Flop conversions; Master-Slave JK.	3
Registers and Counters	Registers and Counters: Shift Registers: Introduction to shift registers, Basic Shift Register Operations, types of shift registers, Bidirectional Shift Registers, Shift Register Counters. Typical ICS for shift registers. Counters: Introduction to counters, Types of Counters-Asynchronous and synchronous counters, Up/Down Synchronous Counters, Cascaded Counters, Counter Decoding, State table, excitation table concepts, Design of asynchronous and synchronous counters, Typical ICS for counters, Applications of counters	8
Memories and Storage	Semiconductor Memory Basics, Types-RAM, ROM, Programmable ROMs, Flash Memory, Memory Expansion, Special Types of Memories, Magnetic and Optical Storage	2
Logic Families	Definition of parameters-current voltage parameters, Fan in, Fan out, Noise Margin, Propagation Delay, Power Dissipation; Resistor Transistor Logic(RTL),Diode Transistor Logic (DTL), Transistor-Transistor Logic (TTL), Typical TTL NAND Gate, Function of the Input Transistor, Volt-Ampere Characteristics, Emitter Coupled Logic (ECL) and MOS-logic, Comparison of Various Logic Families.	6

List of Practical:

1. Familiarization of ICs
   a. Testing of AND Gate
   b. Testing of NAND gate
   c. Testing of OR Gate
   d. Testing of NOR gate
   e. Testing of XOR gate
2.
3. Verification of truth table for encoder and decoder ICs, Mux and DeMux
4. Verification of the truth table for positive edge triggered, negative edge triggered,level triggered IC flip-flops (At least one IC each of D latch , D flip-flop, JK flip flops).
5. To realize half/full adder and half/full subtractor
6. o convert Binary code to gray code
7. To convert Gray to Binary Code.
8. To design a Seven Segment Decoder.

9. Study the Resistor Transistor Logic(RTL),Diode Transistor Logic (DTL), Transistor-Transistor Logic (TTL).

Note: *Above experiments may preferably be done on Bread Board with proper circuits/ digital kits / simulators as per requirement.*

Teaching Approach:

Chalk & Talk, audio visual aids, online tutorials, Practical practice, revision of topics

References:

1. R.P Jain, "Modern Electronics" , TMH , 2nd Edition.
2. Malvino & Leach- Digital Principles & Application-Mcgraw Hill- 5th Edition.
3. Mano, M. Morris- Digital Logic and Computer Design- Prentice Hall (India)
4. R.J Tocci, "Digital System", PHI 2000
5. I.J. Nagrath, "Electronics, Analog & Digital", PHI 1999.

Open Source/Online Resources:

1. https://www.tutorialspoint.com/digital_circuits/digital_circuits_tutorial.pdf
2. https://learnabout-electronics.org/Downloads/Digital-Electronics-Module-05.pdf
3. https://www.youtube.com/watch?v=lgVwPW8OanU
4. https://www.youtube.com/watch?v=cdMJvFT-Afc

Microprocessor	
Semester 2	
Course Code:	CS-PC203
Course Title:	Microprocessor

Rationale:

This course will provide the detailed overview of the 8085 Microprocessor in terms of its architecture, program execution, bus structure, data transfer, interrupts and other related interfacing techniques. Eventually, this will lead to the understanding of working of the CPU of a Microcomputer.

Course Objective:

- To understand the Architecture and instruction set of 8-bit microprocessor computer systems
- To provide the basic knowledge of Assembly Language programming using 8085 kit / Macro Assembler
- To introduce students with the programmable support chips used in Microprocessor-based system and their applications
- To provide brief introduction of 8086 Microprocessor

Learning Outcome:

On completion of the course, student will be able to:

- · Explain the basic of 8085 Microprocessor and its Architecture
- Get familiarity with 8085 instruction set and instruction execution
- Apply logic for various given problem and develop programs using Assembly Language instruction set
- Understand the concept of Computer Interrupts and their handling

Course Content:

Unit	Title	Hours
Microprocessor Architecture (8085)	Architecture of 8085 Microprocessor, Functions of ALU, Timing and Control Unit, Functional Pins and Registers Organization, Bus and its types, 8085 Instruction Cycle, Machine Cycle and State Timing Diagram - opcode fetch cycle, Memory read and write operation. Memory organization and interfacing, Memory map, Address decoding and Memory address	8
Instruction set and addressing modes (8085)	Instruction Set, Instruction classification, Addressing modes, Data transfer instructions, Arithmetic instructions, Logic instructions, Branch instructions, Stack instructions, Machine control instructions	5
Programming Concepts (8085)	Looping, Counting, Indexing, Sorting, Use of counters and time delays, Use of stack and subroutines	5

Interrupts	Interrupt Handling, Interrupts of 8085, Priority of interrupts, Restart instructions, Interrupts: Software and Hardware, Enabling, Disabling and Masking of interrupts	5
Interfacing and Data transfer scheme	Basic interfacing concepts, Memory mapped I/O, I/O mapped I/O, I/O Operations, Programmed I/O, Interrupt driven I/O, Synchronous and Asynchronous data transfer, Microprocessor-controlled data transfer and Peripheral controlled data transfer	6
Supported Chips	8255 Programmable Peripheral Interface, 8253/8254 Programmable Timer, 8279 Programmable keyboard / Display interface, 8257 DMA controller, 8259/8259A Programmable Interrupt Controller	6
Microprocessor Applications and Advance microprocessor	Temperature Controller, Traffic light Controller, Brief overview of 8086 microprocessor (Pin diagram, Functional Organization, Register Organization)	4

List of Practicals:

1. Program to add two 8-bit numbers.
2. Program to subtract two 8-bit numbers.
3. Program to add two 16-bit numbers.
4. Program to subtract two 16-bit numbers.
5. Program to add N one-byte numbers.
6. Program to add two BCD numbers.
7. Program to implement multiplication by successive addition method.
8. Program to move data blocks with and without overlap.
9. Program to find the smallest and largest of three numbers.
10. Program to find the smallest and largest of N numbers.
11. Program to find number of 1's and 0's in 8-bit number.
12. Program to find sum of ODD and EVEN numbers.
13. Program to sort an array.
14. Program to implement BINARY to BCD conversion using a subroutine.
15. Program to implement counter with time delay.

Teaching Approach:

Chalk & Talk, audio visual aids, online tutorials, Practical practice, revision of topics

References:

1. Ramesh S. Gaonkar, "Microprocessor, Architecture, Programming, and Applications with the 8085", Penram International Publication, 5/e
2. Fundamentals of microprocessor and microcomputer-B Ram.