Semester V
DSC -5S- Electronics
Measuring Instruments

Unit I : Basic Instrumentation: (12L)

Block diagram of generalized instrumentation system, Concept of transducers Primary and secondary, active and passive, analog and digital). Resistive transducer -potentiometer, Inductive transducer - LVDT, capacitive transducer (by changing distance), measurement of displacement using capacitive transducer (By changing dielectric).

UNIT II: Measurement of Temperature: (12L)

Thermocouple, Thermopile, Thermister, RTD, Total Radiation Pyrometer, IC DS 1621, IC LM34 , IC LM35 , Infrared Pyrometer,

Unit III : Timer and PLL: (12L)

IC 555 timer: Block diagram and function of each block, application of 555 timer as astable, monostable and bistable multivibrator (construction, working and expression for time period).PLL Block diagram and function of each block, concept of capture range, pull in time, lock in range, electrical characteristics, applications of PLL as FM demodulator, AM detector and frequency synthesizer

Unit IV : Display, digital Instrument and Ecoder: (12L)

Seven segment, 14 segment, dot matrix, 16x2 LCD display, advantage and disadvantage, Digital instrument: Digital frequency meter, Digital voltmeter (Ramp type), Digital capacitance meter (Block diagram and function of each block) . Recorder: Classification, necessity of recorder, XY recorder, magnetic tape recorder.

Unit V : Biomedical electronics: (12L)

Introduction, Type of electrode, EEG, EMG, ECG-block diagram and function of each block, X ray machine, instantaneous heart rate meter-systolic and diastolic blood pressure meter, EAR oximeter, pulse Oximeter, range gated pulse Doppler blood flow meter, Laser Doppler blood flow meter.

Unit VI : DSC-5S-SEM (18L)

- Identification of primary transducer
- Identification of secondary transducer
- Study of LVDT
- Study of capacitive transducer
- Study of thermocouple
- Study of thermopile
- Identification of IC DS1621
- Identification of IC LM34
- Identification of IC LM35
- Use of 555 timer as astable multivibrator.
- Use of 555 timer as monostable multivibrator.
- Use of 555 timer as bistable multivibrator.
- Study of PLL.
- Study of seven segment display

- Study of digital voltmeter
- Study of digital capacitance meter
- Identification of electrodes
- Study of ECG
- Study of EMG

PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

DSC-5S

Sr.No.	Topic	What the student will be able to do at the end of Module/Unit (Knowledge/ Skill achieved OR Application of Knowledge /Skill to do what)
1	**Unit I : Basic Instrumentation:** Block diagram of generalized instrumentation system, Concept of transducers Primary and secondary, active and passive, analog and digital). Resistive transducer - potentiometer, Inductive transducer - LVDT, capacitive transducer (by changing distance), measurement of displacement using capacitive transducer (By changing dielectric).	At the end of this unit, students will be able to know generalized instrumentation system, transducers, and types of transducers, resistive transducer, potentiometer, inductive, capacitive transducers etc.
2	**UNIT II: Measurement of Temperature :** Thermocouple, Thermopile, Thermister, RTD, Total Radiation Pyrometer, IC DS 1621, IC LM34 , IC LM35 , Infrared Pyrometer,	At the end of this unit, students will be able to understand thermocouple, what is Thermopile, Thermister, RTD , Pyrometer, ICs LM34 and LM35 used to measurement of temperature etc.
3	**Unit III : Timer and PLL:** IC 555 timer: Block diagram and function of each block, application of 555 timer as astable, monostable and bistable multivibrator (construction, working and expression for time period).PLL Block diagram and function of each block, concept of capture range, pull in time, lock in range, electrical characteristics, applications of PLL as FM demodulator, AM detector and frequency synthesizer	At the end of this unit, students will be able to understand Timer, timer as astable, bistable and monostable multivibrator , PLL , characteristics of PLL, application of PLL such as AM, FM detector, etc.
4	**Unit IV : Display, digital Instrument**	At the end of this unit, students will

	and ecorder: Seven segment, 14 segment, dot matrix, 16x2 LCD display, advantage and disadvantage, Digital instrument: Digital frequency meter, Digital voltmeter (Ramp type), Digital capacitance meter (Block diagram and function of each block) . Recorder: Classification, necessity of recorder, XY recorder, magnetic tape recorder.	be able to understand Seven segment, 14 segment, dot matrix, 16x2 LCD display system, advantages and disadvantages, Digital frequency meter, Digital voltmeter (Ramp type), Digital capacitance meter. Recorders: XY and magnetic tape etc.
5	**Unit V : Biomedical electronics:** Introduction, Type of electrode, EEG, EMG, ECG-block diagram and function of each block, X ray machine, instantaneous heart rate meter-systolic and diastolic blood pressure meter, EAR oximeter, pulse Oximeter, range gated pulse Doppler blood flow meter, Laser Doppler blood flow meter.	At the end of this unit, students will be able understand biomedical detectors: EEG, EMG, ECG, X ray machine, instantaneous heart rate meter, systolic and diastolic Blood pressure, EAR oximeter, pulse Oximeter, range gated pulse Doppler blood flow meter, Laser Doppler blood flow meter.

Books Recommended:

1.Electrical and electronics measurement and Instrumentation by A.K. Sawhney
2. Linear integrated Circuits by Ramakant Gaikwad
3. Biomedical instrumentation by R.S.Khandpur
4. Integrated electronics by Millman Halkins
5. Principle of electronics by V.K.Mehta
6. Liner integrated circuit by Ramakant Gayakwad.
7. Basic electronics by B.L.Thereja.

Practicals:

Minimum Ten experiments at least one on each of the following aspects.

1. Transducer LVDT, C transducer
2. Measurement of Temperature. RTD, LM34 ,LM35 etc.
3. IC 555 timer. Astable , monostable , bistable M.V.
4. PLL, FM demodulator ,AM detector
5. Display system. LCD display , seven segment display other etc.
6. Recorder, Magnetic tape etc
7. Biomedical instruments, ECG , EMG, EEG , heart rate meter ,oximeter etc .

Semester VI

DSC -6S- Electronics

Course Title – Advance Microprocessor and Microcontroller

Unit I : 8086 Architecture: (12L)

Block diagram of 8086 microprocessor, BIU and EU, operating modes of 8086, register of 8086-G.P.R,pointer and index register, segment register, concept of segmented memory, instruction pointer, status flag, pin diagram of 8086 microprocessor, physical and effective address.

Unit II : Instructions and programming of 8086: (12L)

Instructions: MOV, PUSH, POP, LEA, LDS, LES, Arithmetic & Logic Instructions. Addressing mode, 8086 instruction, Bus cycle, Programming: programs of data transfer, addition, subtraction, division, multiplication using various addressing mode

Unit III : 8051 Microcontroller Architecture: (12L)

Microcontroller Introduction, Difference between Microprocessor and Microcontroller, block diagram of microcontroller, CPU, registers, flags, PSW, PC, Data Pointer, SFR, SP, Internal RAM/ROM, External memory, I/O ports, counter & timers, interrupts.

Unit IV: Instruction set of 8051 and Programming: (12L)

Addressing mode, Instruction set: Data transfer, arithmetic, logical operation, JUMP, Loop and CALL instructions. Assembly language programming examples: simple data transfer, arithmetic, logical and single bit.

Unit V: 8051 Interfacing & Application: (12L)

Basics of serial communication, interfacing with RS-232C, SCON and PCON registers, interfacing a DAC / ADC and waveform generation, interfacing to the 8255, interfacing LED, power reduction mode.

Unit VI: DSC-6S-SEM (18L)

- Study of microprocessor 8086
- Skill of drawing of flowchart
- Skill of writing algorithm
- Skill of writing program for addition using 8086
- Skill of writing program for Subtraction using 8086
- Skill of writing program for multiplication using 8086
- Skill of writing program for division using 8086
- Skill of writing program using subroutine using 8086
- Study of microcontroller 8051
- Skill of writing program for addition using 8051
- Skill of writing program for Subtraction using 8051
- Skill of writing program for multiplication using 8051
- Skill of writing program for division using 8051
- Skill of writing program using subroutine using 8051
- Study of interfacing 8255 with RS 232
- Study of DAC/ADC

PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

DSC-6S

Sr.No.	Topic	What the student will be able to do at the end of Module/Unit (Knowledge/ Skill achieved OR Application of Knowledge /Skill to do what)
1	**Unit I : 8086 Architecture:** Block diagram of 8086 microprocessor, BIU and EU, operating modes of 8086, register of 8086-G.P.R,pointer and index register, segment register, concept of segmented memory, instruction pointer, status flag, pin diagram of 8086 microprocessor, physical and effective address.	After completion of this unit, students will be able to understand the architecture of 8086 microprocessor, different blocks of 8086 µp, different pins of 8086 µp, concept of physical address and effective address, etc.
2	**Unit II : Instructions and programming of 8086:** Instructions: MOV, PUSH, POP, LEA, LDS, LES, Arithmetic & Logic Instructions. Addressing mode, 8086 instruction, Bus cycle, Programming: programs of data transfer, addition, subtraction, division, multiplication using various addressing mode	After completion of this unit, students will be able to understand different types of instructions in 8086 µp, programming for data transfer, addition, subtraction, division, multiplication using various addressing mode, etc.
3	**Unit III : 8051 Microcontroller Architecture:** Microcontroller Introduction, Difference between Microprocessor and Microcontroller, block diagram of microcontroller, CPU, registers, flags, PSW, PC, Data Pointer, SFR, SP, Internal RAM/ROM, External memory, I/O ports, counter & timers, interrupts.	At the end of this unit, students will be able to understand the architecture of 8051, difference between 8086 µp and 8051 µc, various blocks of 8051 µc and pins of 8051 µc, Understand the working of SFR, SP, RAM/ROM, etc.
4	**Unit IV: Instruction set of 8051 and Programming: (12L)** Addressing mode, Instruction set: Data transfer, arithmetic, logical operation, JUMP, Loop and CALL instructions. Assembly language programming examples: simple data transfer, arithmetic, logical and single bit.	After completion of this unit, students will be able to analyze different types of instructions in 8051 µc, how program for data transfer, addition, subtraction, division, multiplication using various addressing mode, program for subroutine, etc.
5	**UNIT V: 8051 Interfacing &**	At the end of this unit, students will

	Application: Basics of serial communication, interfacing with RS-232C, SCON and PCON registers, interfacing a DAC / ADC and waveform generation, interfacing to the 8255, interfacing LED, power reduction mode.	understand interfacing, basics of serial communication, 8051 interface with RS-232C, DAC / ADC and LED, power reduction mode, etc.

Books Recommended:

1.Microprocessor Architecture and application by Dougulus Hall.

2. Intel Microproceesor 8086 by Brey: PHI

3. The 8051 Microcontroller architecture, Programming & Applications- Kenneth J.Ayala (Penram international)

4.The 8051 Microcontroller and Embedded Systems.- M. A. Mazadi, J. C. Mazadi (Pearson Education, Asia)

5. Microprocessor, microcontroller & applications- U. S. Shah (TechMax Publication Pune).

6. Programming and Customizing the 8051 Microcontroller- Mike Predko (TMH, New Delhi)

7. Advanced Digital Electronics, Microprocessor and 8051 Microcontroller by Y.B.Gandole, D.S.Dhote and S.P.Yawale. G.C. publisher, Nagpur

Practicals:

Minimum Ten experiments at least one on each of the following aspects.

1. Data transfer using 8086 µp
2. Arithmetic group using 8086 µp
3. Addition, subtraction, multiplication, division etc
4. Logical using 8086 µp
5. Data transfer using 8051 µc
6. Arithmetic using 8051 µc
7. Addition, subtraction, multiplication, division etc
8. Logical using 8051 µc

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