

Veer Narmad South Gujarat University, Surat
Syllabus of Applied Electronics for S Y B Sc
Semester-3 (with effect from **June 2012**)
Electronics Paper – 3 (*Electronics Devices & Circuits*)

Unit-I: *Signal Amplification and Circuit Stability*

Introduction; Small-signal transistor model; Hybrid-model; h-parameter model; Transistor biasing, Bias design, AC Gain, Input-Output impedance, Some special circuits, Darlington pair, Feedback pair, Emitter coupled pair, CMOS circuits, examples (3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12)

Unit-II: *Frequency response of an amplifier & Feedback in amplifier*

Introduction; Classification of amplifier; Single-stage RC Coupled amplifier; Frequency Response; Tuned amplifier. Gain bandwidth product; Multistage amplifier; Examples (4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.8)

Feedback concepts; Types of feedback circuits; Block diagram representation of feedback amplifier; Loop Gain ; Effect of feedback on Impedances, Some negative feedback circuits; Properties of negative feedback; Stability in feedback amplifiers (6.1,6.2,6.3,6.4,6.5,6.6,6.7,6.8,)

Unit-III: *Oscillators*

Oscillator Operation; Effect of positive feedback; Criterion for Oscillation, RC Oscillators; LC Oscillators; Tuned Oscillators; Crystal Oscillators; Unijunction Oscillators; (6.9,6.10,6.11,6.12,6.13,6.15)

Recommended Books:

- 1) I J Nagrath, Electronics Devices and Circuits, PHI, New Delhi (2007)
- 2) Millman, Halkias, Satyabrata, Electronics Devices and Circuits, TMH, New Delhi
- 3) D A Bell , Electronics Devices and Circuits, PHI (2006)
- 4) Kumar & Jain, Electronics Devices and Circuits, 2nd Ed, PHI, New Delhi
- 5) A Mottershead, Electronics Devices and Circuits An Introduction, PHI, New Delhi.
- 6)

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Syllabus of Applied Electronics for S Y B Sc
Semester-3 (with effect from **June 2012**)
Electronics Paper – 4 (*Microprocessor Circuits & Application*)

Unit-I: *Introduction to Microprocessors*

Introduction to Microprocessor; Architecture of Intel 8085A: Register Set, General and special purpose registers, their functional aspects, ALU, flag register and its importance, Timing and Control unit.

Pin Diagram of 8085A, ALE signal, De-multiplexing of address and data bus, Clock and Reset circuits

Unit- II: *Assembly Language Programming*

Instruction set of 8085A, Op Code, Operand, Instruction word size, Addressing Mode, Data transfer Instructions, Arithmetic and Logical Instructions, Branch, Stack, I/O and Machine control Instructions; Instruction Cycle: Fetch and Execution cycle; Concept of timing diagram of some of the basic operation of 8085A microprocessor: Op Code fetch, memory read, memory write, I/O read, I/O write. Interrupts scheme of 8085A: Hardware and software interrupt vectored interrupt and non-vectored interrupt

Concept and importance of algorithm and flow chart, introduction to assembler and use of assembler for the following programs

Suggested list of program to be done in class and practical

1. *Addition of two and series of 8-bits/16-bits numbers,*
2. *Decimal addition of two 8-bits/16-bits numbers,*
3. *Decimal subtraction,*
4. *One's and Two's complement of 8-bit/16-bits,*
5. *Shifting and Mask-off certain bits,*
6. *To find Square,*
7. *Largest number, Smallest number from a data array,*
8. *To arrange data in ascending and descending order,*
9. *Movement of block of data and exchange of block of data from one memory location to other,*
10. *Binary up/down counter with appropriate delay,*
11. *Decimal up/down counter with appropriate delay,*
12. *Delay subroutine using one/two registers,*
13. *Concept of build-in delay and display subroutines,*

(Note: Above list of Programs is only a suggestive list. Students should practice sufficient programs covering the complete Instruction set and concept of 8085A microprocessor programming.)

Unit-III: Peripheral Interfacing Chips

Programmable Peripheral Interface: 8255; Functional Description:Operational Modes, Functional Organization, Block diagram of 8255; Programming and Operation; Programming in Mode 0, Mode 1, mode 2.

Programmable Interval Timer 8253: Modes of Operation: Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, Mode 5, Mode 6;Mode Description; Internal Organization and interfacing; Programming 8253;

Recommended Books:

- 1) Ghose& Sridhar, 0000 to 8085 Introduction to Microprocessors for Engineers and Scientists, PHI New Delhi
- 2) K Udaya Kumar and B S Umashankar, The 8085 Microprocessor Architecture, Programming and Interfacing, Pearson Education.
- 3) Ajay Wadhawa, Microprocessor Architecture, Programming and Interfacing, PHI New Delhi
- 4) R S Gaonkar, Microprocessor Architecture, Programming and Interfacing,
- 5) Mathur, Microprocessor 8085 and its interfacing, 2nd Ed, PHI, New Delhi
- 6) Srinath, 8085 Microprocessor: Programming and Interfacing, PHI, New Delhi

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Electronics Paper – 5 (*Simulation using MATLAB*)

Unit- I:

Introduction to MATLAB, overview, starting MATLAB Session, understanding the MATLAB desktop and its environment, quitting the MATLAB session

Unit-II:

Elementary MATLAB Constructs, MATLAB Variables, Arithmetic Operations, Logical and Relational Operations, Mathematical Functions, Graphical Functions, I/O Operations, Elementary Matrix Manipulations

MATLAB Programming, MATLAB Procedures, MATLAB Functions, MATLAB Language Constructs, Function Handles, Solution of Differential Equations

Unit-III:

SIMULINK, Operating Principle and Management of Simulink, Constructing a Simulink Block Diagram, Parametrizing Simulink Blocks, Simulink Simulation, Solving Differential Equations with Simulink, Simplification of Simulink Systems, the Function Block, Construction of Subsystems, Interaction with MATLAB, Simulations in MATLAB, Transfer of Variables through Global Variables, Dealing with Characteristic Curves

Reference books

- 1) Y Kirani Singh & B B Chaudhuri, MATLAB Programming, PHI, New Delhi
- 2) Rudra Pratap , Getting Started with MATLAB 7, Oxford University Press (Indian Edition).
- 3) Steven T. Karris, Signals and Systems with MATLAB ® Computing and Simulink ® Modeling, 4th edition, 2008, Orchard Publications
- 4) B. Hunt, R. Lipsman, J. Rosenberg, K. Coombes, J. Osborn, G. Stuck A Guide to MATLAB for Beginners and Experienced users, Cambridge University Press, 2001.
- 5) Andrew Knight, CHAPMAN & HALL/CRC Andrew Knight , BASICS OF MATLAB® and Beyond
- 6) INTRODUCTION TO MATLAB® & SIMULINK *A Project Approach*, Third Edition
O. BEUCHER and M. WEEKS

Veer Narmad South Gujarat University, Surat
Syllabus for Practical Laboratory work in Applied Electronics at S Y B Sc
Semester–3 (with effect from *June 2012*)

There will be three days of Laboratory/practical work per week each of three hours duration. The examination will be one practical each from the three groups viz Analog Electronics, Microprocessor and MetLab.

List of Laboratory Experiments Electronics for S Y B Sc Semester - 3:

1. CE Amplifier
2. Current Feedback Amplifier
3. Voltage Feedback Amplifier
4. Phase Shift Oscillator
5. UJT relaxation oscillator
6. Study of PC motherboard and its different blocks.
7. Study of assembling a PC loading an OS and various devices drivers
8. Microprocessor Programming
 1. Addition of two and series of 8-bits/16-bits numbers
 2. Decimal addition of two 8-bits/16-bits numbers
 3. Decimal subtraction
 4. One's and Two's complement of 8-bit/16-bits
 5. Shifting and Mask-off certain bits
 6. To find Square
 7. Largest number Smallest number from a data array
 8. To arrange data in ascending and descending order
 9. Movement of block of data
 10. Exchange of block of data
 11. Binary up/down counter with appropriate delay
 12. Decimal up/down counter with appropriate delay
 13. Delay subroutine using one/two registers
 14. Concept of build-in delay and display subroutines
9. MATLAB Programming
 1. Hands on with MATLAB (Data type operators writing of simple equations etc.)
 2. Vectors and Matrices
 3. Vectors and matrix operations
 4. Simulation :
 - 4.1 To creat arrays and vectors and perform arithmetic and trigonometric operations on them.
 - 1.2 To make simple 2-D plot in MATLAB
 - 1.3 To create script files and execute them in MATLAB
 - 1.4 To learn difference between a script file and a function file and execute a function file.
 - 1.5 Array and matrix simple computation and manipulation.

- 1.6 To define and use anonymous functions in command-line computation.
- 1.7 To learn and do simple symbolic algebra in MATLAB.
- 1.8 To read data from common data files into MATLAB workspace and save data into a MATLAB readable file.
- 1.9 Publish report
- 1.10

Veer Narmad South Gujarat University, Surat
Syllabus of Applied Electronics for S Y B Sc
Semester-4 (with effect from **June 2012**)
Electronics Paper – 3 (Embedded System)

Unit-I: *Architecture of 8051*

Introduction to Microcontrollers, 8051 microcontroller Architecture; CPU; Internal RAM, ROM, 8051 Registers, Register Bank, addressing the bank, Bit addressable RAM of 8051, Concept of SFR, I/O Ports and registers associated with the ports; Pin-out of 8051; Clock and Oscillator; Reset Circuit, Power saving mode.

Unit-II: *Instruction set of 8051*

Addressing modes; Data transfer instructions; Arithmetic and Logical Instructions; Jump and CALL instructions

8051 Timers and Counters; 8051 Serial Ports; Interrupt structure, 8051 Timer and serial communication programming

Unit-3: *8051 Programming in C*

Introduction to the C Compiler for 8051, Structure of the C program, Using Compiler to write test and the following programs

Suggested list of program to be done in class and practical

- *Writing simple program to add and subtract*
- *Write a program to toggle all the bits of ports P0 and P1 continuously such that P0 = FFH, and P0 = 00 and vice-versa.*
- *Write a program to toggle port 1 to turn OFF and ON LEDs connected to the port.*
- *Write a program to flash LEDs 10 times.*
- *Write a program to get the byte of a data from P1 and then send it to P2*
- *Write a program to read a byte of a data from P0 and send it to port P1 if it is less than 50 otherwise send it to P2.*
- *Interfacing an LCD to 8051*
- *Write a program to send a given message “ Jay Hind” on the LCD connected to P0 (every time to latch the data into the LCD, it is necessary to make its enable (En) pin from High to Low).*
- *Write a program to convert ASCII digits of two keys ‘5’ and ‘6’ to packed BCD and display them on LCD*
- *Write a program to calculate the checksum byte for the given data of four bytes.*
- *Write a program if the crystal frequency is 12 MHz, find the count needed to be loaded into the timer registers, if required time delay is 5 ms.*
- *Create a pulse having width of 5 ms on P1.5 using timer 0.*
- *Write a program, if crystal frequency is 11.0592 MHz.*
- *Use timer auto reload mode of 8051 generates a square wave of 2 KHz on port pin 1.0.*

- *Write a program to transfer 'A' to 'Z' letters continuously using second serial port*

Recommended Books:

- 1) Chattopadhyay, Embedded System Design, PHI, New Delhi
- 2) Ajit Pal, Microcontrollers: Principle and Applications, PHI, New Delhi
- 3) K J Ayala & D V Gadre, The 8051 Microcontroller & Embedded Systems Using Assembly and C, Cengage Learning.
- 4) B Kanta Rao, Embedded Systems, PHI , New Delhi
- 5) M A Mazidi, J G Mazidi and R D Mckinlay, The 8051 microcontroller and Embedded systems using Assembly and C”, Second Edition, Pearson
- 6) Kenneth Ayala, Delmar Cengage, Fearing, The 8051 Microcontroller Architecture, Programming & Applications”, Third Edition, TMH, New Delhi
- 7) RajKamal, Embedded systems Architecture, Programming and Design, TMH, New Delhi.

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Syllabus of Applied Electronics for S Y B Sc
Semester-4 (with effect from *June 2012*)
Electronics Paper – 4 (Advance Microprocessor)

Unit-I: *Architecture and functional block diagram of 8086 microprocessor*

Features of 16-bit microprocessor; Architecture of 8086 Microprocessor, Pin configuration of 8086 microprocessor: Common pins, Minimum Mode, Maximum Mode; Architecture of microprocessor 8086: General purpose registers, Operand registers, ALU, Flag registers; Instruction queue and pipelining; Segmentation of memory used in 8086; method of generating Physical Address in 8086 microprocessor; Memory pointers: IP, SP, BP, BX, use of SI and DI in string operation; Addressing modes of 8086 microprocessor; (2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9)

Data transfer instruction; Stack instructions; arithmetic instructions; Multiplication Instructions; Division Instructions; Logical Instructions, Flag Controlling Instructions; Branch Instructions; (3.1, 3.2, 3.3, 3.5, 3.6, 3.7, 3.8, 3.9)

Unit-2: *Assembly Language Programming*

- Assembly language program to add two numbers
- Assembly language program to find average of two numbers
- Assembly language program to find sum of numbers in the array
- Assembly language program to find the maximum in the array
- Assembly language program to separate the odd and even numbers from the array
- Assembly language program to convert binary number into its Decimal and then ASCII equivalent and display the number
- Assembly language program to convert the BCD number from keyboard to its Hex equivalent.

Unit-3: *Programmable Interrupt Controller 8259*

Features of 8259; Architecture of 8259 PIC; Pin configuration of 8259 PIC; Control and Command word; Defining Operating Modes of 8259 PIC; (11.1, 11.2, 11.3, 11.4, 11.5,)

Recommended Books:

- 1) Nilesh B Bahadure, Microprocessors 8086/8088, 80186/80286, 80386/80486 and the Pentium Family, PHI, New Delhi.
- 2) K Udaya Kumar and B S Umahsanker, Advanced Microprocessors & IBM-PC Assembly Language Programming, TMH, New Delhi
- 3)

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Semester–4 (with effect from **June 2012**)
Electronics Paper – 5 (Data Communication)

Unit–I: *Data Communication and Data Networking*

Data communication and Networking for Today's Enterprise; A communication model; Data Communications; Networks; The internet; The need for Protocol Architecture; TCP/IP Protocol Architecture; OIS Model; Standardization within protocol Architecture(1.1,1.2,1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4)

Unit-II: *Data Transmission & Signal Encoding Technique*

Concepts and terminology; Analog and Digital Transmission; Transmission Impairment; Channel capacity, Guided Transmission Media, Wireless Transmission (3.1, 3.2, 3.3, 3.4, 4.1, 4.2)

Digital Data - Digital Signals, Digital Data - Analog Signals; Analog Data - Digital Signals, Analog Data - Analog Signals; Asynchronous and Synchronous Transmission; Types of Error, Error Detection; Line Configuration (5.1, 5.2, 5.3, 5.4, 6.1, 6.2, 6.3, 6.5)

Unit – III: *Data Link Control Protocols and Multiplexing*

Flow control; Error control; High-level Data Link Control; Frequency-Division Multiplexing; Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing (7.1, 7.2, 7.3, 8.1, 8.2 8.3)

Recommended Books:

- 1) Data and Computer Communication s, 8th Ed (2007), William Stallings, Person Education Low Price Edition
- 2) Micheal A . Miller, Digital and Data Communication ,4th edition, Jaico Pub House
- 3) Frenezel Louis E., Communication Electronics, TMH, New Delhi
- 4) Rappaport, Wireless Communication, 2nd edition, PHI, New Delhi

Veer Narmad South Gujarat University, Surat
Syllabus for Practical Laboratory work in Applied Electronics at S Y B Sc
Semester-4 (with effect from *June 2012*)

There will be three days of Laboratory/practical work per week each of three hours duration. The examination will be one practical each from the three groups viz Microcontroller and Advanced Microprocessor. There will be a minor project work/case study to be carried out by students in a group of not more than four students in a group.

Project:

- A student is required to take up a minor project/case study work as a part of the laboratory work
- Objectives of the project/case study are to learn practical concepts of electronics used in computers and other contemporary technology.
- The project/case study work will carry one-third proportion of the laboratory work
- The project/case study work should be carried out by the students in a group of not more than 4 students (Preferably 3)
- The students are required to make a project/case study report and demonstrate/presentation of their work and appear for the viva-voice examination.

List of Laboratory Experiments in Applied Electronics for S Y B Sc Semester - 4:

Microcontroller Programming

1. Writing simple program to add and subtract
2. Write a program to toggle all the bits of ports P0 and P1 continuously such that P0 = FFH, and P0 = 00 and vice-versa.
3. Write a program to toggle port 1 to turn OFF and ON LEDs connected to the port.
4. Write a program to flash LEDs 10 times.
5. Write a program to get the byte of a data from P1 and then send it to P2
6. Write a program to read a byte of a data from P0 and send it to port P1 if it is less than 50 otherwise send it to P2.
7. Interfacing an LCD to 8051
8. Write a program to send a given message “Jay Hind” on the LCD connected to P0 (every time to latch the data into the LCD, it is necessary to make its enable (En) pin from High to Low).
9. Write a program to convert ASCII digits of two keys ‘5’ and ‘6’ to packed BCD and display them on LCD

10. Write a program to calculate the checksum byte for the given data of four bytes.
11. Write a program if the crystal frequency is 12 MHz, find the count needed to be loaded into the timer registers, if required time delay is 5 ms.
12. Create a pulse having width of 5 ms on P1.5 using timer 0.
13. Write a program, if crystal frequency is 11.0592 MHz.
14. Use timer auto reload mode of 8051 generates a square wave of 2 KHz on port pin 1.0.
15. Write a program to transfer 'A' to 'Z' letters continuously using second serial port

Advance Microprocessor

1. Assembly language program to add two numbers
2. Assembly language program to find average of two numbers
3. Assembly language program to find sum of numbers in the array
4. Assembly language program to the maximum in the array
5. Assembly language program to separate the odd and even numbers from the array
6. Assembly language program to convert binary number into its Decimal and then ASCII equivalent and display the number
7. Assembly language program to convert the BCD number from keyboard to its Hex equivalent.