

**B.Sc. Electronics Syllabus**  
**Semester VI – Paper 7**  
**EL-601T COMMUNICATION-II**

**UNIT 1:**

**08 hours**

**Digital communication**

Introduction to pulse and digital communications, digital radio, sampling theorem, types- PAM, PWM, PPM, PCM – quantization, advantages and applications, digital modulations (FSK, PSK, and ASK). Advantage and disadvantages of digital transmission, characteristics of data transmission circuits – Shannon limit for information capacity, bandwidth requirements, data transmission speed, noise, cross talk, echo suppressors, distortion and equalizer, MODEM– modes, classification, interfacing (RS232).

**UNIT 2**

**09 hours**

**RADAR Systems**

RADAR– principles, frequencies and powers used in RADAR, maximum Unambiguous range, detailed block diagram of pulsed RADAR system, RADAR range equation-derivation, factors influencing maximum range, effect of ground on RADAR antenna characteristics, Doppler effect, MTI RADAR-block diagram, CW RADAR-block diagram, advantages, applications and limitations, FM CW RADAR-block diagram, numerical examples wherever applicable.

**UNIT 3**

**08 hours**

**Satellite communication**

Introduction, need, satellite orbits, advantages and disadvantages of geostationary satellites. Satellite visibility, satellite system – space segment, block diagrams of satellite sub systems, up link, down link, cross link, transponders (C- Band), effect of solar eclipse, path loss, ground station, simplified block diagram of earth station. Satellite access – TDMA, FDMA, CDMA concepts, comparison of TDMA and FDMA, Satellite antenna (parabolic dish antenna), GPS-services like SPS & PPS.

**UNIT 4**

**09 hours**

**Optical Fiber Communication**

Introduction – need for OFC. Block diagram of OFC system. Fiber optic cables, light propagation through fiber – step index fiber, graded index fiber, Snell’s law, numerical aperture (derivation). Types of optical fiber cables, light sources – requirements, LEDs and semiconductor laser diodes. Photo detectors – PN, PIN and avalanche photodiodes. Losses in optical fibers – Rayleigh scattering, absorption, leaky modes, bending, joint junction losses. Advantages and disadvantages of OFC over metallic cables.

**Unit 5**

**08 hours**

**Cellular Communication and Wireless LANs**

Concept of cellular mobile communication – cell and cell splitting, frequency bands used in cellular communication, absolute RF channel numbers (ARFCN), frequency reuse, roaming and hand off, authentication of the SIM card of the subscribers, IMEI number, concept of data encryption, architecture (block diagram) of cellular mobile communication network, CDMA technology, CDMA overview, simplified block diagram of cellular phone handset, Comparative study of GSM and CDMA, 2G, 3G and 4G concepts.

Major components of local area network- Primary characteristics of ethernet-mobile IP, OSI model, wireless LAN requirements-concept of Bluetooth, WiFi and WiMAX.

**Text Books:**

1. Electronic Communication systems, Kennedy & Davis, IV<sup>th</sup> edition-TATA McGraw Hill.
2. Introduction to RADAR systems – Skolnik- McGraw Hill.
3. Advanced Electronic Communication systems, Wayne Tomasi- 6<sup>th</sup> edition, Low priced edition- Pearson education

**Reference Books:**

1. Electronic Communication systems, Fundamentals through Advanced, Wayne Tomasi - 5<sup>th</sup> edition.

**Semester VI - Practical VII**

**EL-601P COMMUNICATION and MICROCONTROLLER LAB**

**PART- A**

**Communication Experiments.**

1. ASK modulator and demodulator
2. FSK modulation
3. PWM and PPM
4. PAM modulator and demodulator
5. Band Elimination Filter
6. Two stage RC coupled Amplifier-Determination of mid - band gain of individual stages, overall gain and the concept of loading effect.
7. Study of switched mode regulator using PWM
8. Characteristics of OFC

**Note: Minimum of 5 experiments to be performed from PART- A.**

**PART- B**

**Experiments on Microcontroller Programming**

01. Program to add (with carry) and subtract two 8-bit numbers.
02. Program to find 2's complement of a 16-bit number.
03. Program to find the sum of N 8-bit numbers.
04. Program to find largest of N numbers.
05. Program to find smallest of N numbers
06. Program to find whether the given data is palindrome.
07. Program to arrange the numbers in ascending order.
08. Program to arrange the numbers in descending order .
09. Program to interchange Two one – byte numbers.
10. Program to interchange N one – byte numbers.

**Note: Minimum of 5 experiments to be performed from PART- B.**

**B.Sc. Electronics Syllabus**  
**Semester VI – Paper 8**  
**EL-602T MICROCONTROLLERS**

**UNIT 1:**

**10 hours**

**Introduction to Microcontrollers**

Basic block diagram, comparison of microcontroller with microprocessors, comparison of 8 bit, 16 bit and 32 bit microcontrollers.

Overview of 8051 series—comparison of 8051, 8052, 8031.

Other Microcontroller families (Mention only) – Maxim 89C420, 89C440, 89C450

Atmel Corporation AT89C51, AT 89LV51, AT89C1051, AT89C2051, AT89C52.

MICROCONTROLLER 8051- architecture -internal block diagram, key features of 8051, pin diagram, memory organization, Internal RAM memory, Internal ROM. General purpose data memory, special purpose/function registers, external memory.

Counters and timers – 8051 oscillator and clock, program counter, TCON, TMOD, timer counter interrupts, timer modes of operation. Input / output ports and circuits/configurations, serial data input / output – SCON, PCON, serial data transmission modes.

**UNIT 2:**

**10 hours**

**8051- Interrupts, Addressing modes and Instruction set**

Interrupts – IE, IP, time flag interrupts, serial port interrupt, external interrupts, reset, interrupt control, interrupt priority, interrupt destinations & software generated interrupts.

Addressing modes—immediate addressing, register addressing, direct and indirect addressing,

Data transfer instructions – internal data move, external data move, code memory read-only data move, Push and Pop and data exchange instructions.

Logical Instructions – byte level logical operations, bit level logical operations, rotate and swap operations.

Arithmetic Instructions – flags, incrementing and decrementing, addition, subtraction, multiplication and division, decimal arithmetic, simple programs in assembly language.

**UNIT 3:**

**09 hours**

**8051 programming in C**

Jump and call instructions – jump and call program range, jumps, calls and subroutines, interrupts and returns, simple example programs in assembly language.

8051 programming using C– Data types and time delays in 8051C, I/O programming, logic operations, data conversion programs, accessing code ROM space and data serialization.

Timer / Counter Programming in 8051—Programming 8051 timers, counter programming, programming timers 0 and 1 in 8051 C , example programs.

**UNIT 4:**

**09 hours**

**Interfacing with 8051**

Basic interfacing concepts and interrupts, Programming—8051 interrupts, programming Timer interrupts, programming the external hardware interrupts.

Schematic diagrams and basic concepts of Interfacing of 8051 to keyboard, seven segment display, stepper motor, DAC, ADC and traffic light controller circuits.

**UNIT 5:****04 hours****PIC microcontrollers**

Core features of PIC microcontrollers, overview of various PIC microcontroller series.  
PIC 16F877A-features, pin diagram, I/O ports, interfacing with LCD.

**Semester VI - Practical VIII****EL-602P PROJECT WORK**

- Students in a group, not exceeding **THREE**, should design, fabricate and assemble **ONE** Electronic project in their respective colleges. The department faculty is required to guide the project work.
- Each student should prepare a report and submit the report at the time of the practical examination duly certified by the concerned faculty guide & HOD.
- Department faculty shall ensure that the entire project work is carried out in their respective colleges by utilising the practical classes assigned to practical VIII. A seminar on the project work is compulsory.

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