# DEPARTMENT OF TECHNICAL EDUCATION ANDHRA PRADESH

Name : P NAVEEN KUMAR

**Designation**: C. Lecturer

Branch : ECE

Institute :ANDHRA POLYTECHNIC, KAKINADA

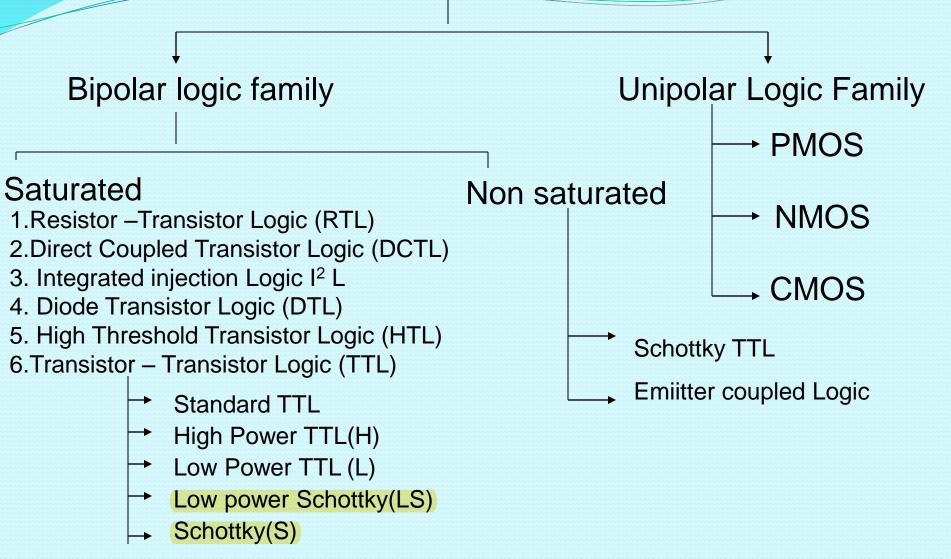
Semester : III Semester

Subject : Digital Electronics

Subject Code : EC 303

**Sub-Topic** : Logic families

## DIGITAL LOGIC FAMILY



9EC305.21 to 22

## **LOGIC FAMILIES**

- A Miniature circuit on the surface of a semi conductor material is a chip.
- The chip is called an Integrated circuit (IC).
- The techniques for manufacturing ICs are bipolar and metal
  - oxide semiconductor (MOS).
- Bipolar families
  - Diode Transistor Logic.
  - Transistor –Transistor Logic.
  - Emitter –Coupled Logic.

# **MOS FAMILIES**

- p-Channel MOSFETs
- n-Channel MOSFETs

- Complementary MOSFETs
- Bipolar technology is faster, used for SSI & MSI.
- MOS technology is used for LSI.
- A Digital family is a group of compatible devices with same
  - logic levels & supply voltages.

## **TTL FAMILIES**

Transistor-Transistor logic is a widely used family.

TTL is fast, in expensive and easy to use.

 Bipolar Transistor Technology is used for MSI & SSI (Medium scale integration and small scale integration).

Used to build all kinds of digital circuits and systems

## **CMOS FAMILIES**

- Complimentary metal-oxide semiconductor devices are chips.
- They combine p-channel and n-channel MOSFETs.
- They are in push-pull arrangement.
- CMOS Devices have very low power.
- They are used in pocket calculators, watches

## **ECL DEVICES**

- The Emitter Coupled Logic is the fastest of all the logic families.
- ECL is realized using difference amplifier.
- Hence, they are not driven into saturation.
- Are used in applications where very high speed is essential.
- Employ Emitter followers at o/p stage hence high degree of Fan-out.
- Disadvantage is highest power dissipation per gate.