



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010  
*Autonomous -ISO 9001 - 2015 Certified*

## ELECTRONICS

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH1T4

**Course Type :** Core(TH)

**Course:** Electronics

**Year of Introduction :**2004

**Year of offering :** 2022

**Year of Revision :**2022

**Percentage of Revision :** Nil

**Semester :** I

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description :** Electronics (22PH1T4) is designed to help the students in enhance the expertise in designing of electronic circuits & integrated circuits and operation of electronic systems. This course comprises subjects like Operational Amplifiers, Communication Electronics, Digital Electronics and Microprocessor. This course deals with control of electron flow by amplification and rectification, which has influenced highly the modern society. Practical applications started with the invention of the diode and the triode in the early 1900s, which made the detection of small electrical voltages. They were responsible for the electronics revolution of the first half of the twentieth century. They enabled the construction of equipment that used current amplification and rectification to give us radio, television, radar, long-distance telephony, broadcasting and communications, the music recording industry and many more..

### Course Objectives:

1. To know the basic concepts of operational amplifier.
2. To understand the practical op-Amp circuits.
3. To understand the importance of communication electronics.
4. To learn the digital electronic circuits.
5. To learn the working of 8085 microprocessor.

**Course Outcomes :** At the end of this course, students should be able to:

CO1: Understand the concepts of differential amplifier.

CO2: Analyze the practical applications of Op-Am

CO3: Understand the process in communication electronics.

CO4: Understand the fundamentals of digital electronics.

CO5: Analyze the architecture of 8085 micro processor.

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p><b>Operational Amplifiers</b></p> <p>Differential Amplifier – circuit configurations – DC analysis – AC analysis, inverting and non-inverting inputs, CMRR, Block diagram of a typical Op-Amp analysis. Op-Amp Architecture, Open loop configuration inverting and non-inverting amplifiers. Op-amp with negative feedback- voltage series feedback- effect of feedback on closed loop gain, input resistance, output resistance, -voltage follower. (CO1)</p>	12
II	<p><b>Practical Op-amps</b></p> <p>Input offset voltage- input bias current- input offset current, total output offset voltage, CMRR frequency response. Summing amplifier, Scaling and Averaging amplifiers, integrator and differentiator. Oscillators principles – oscillator types – The phase shift oscillator, Wein bridge oscillator, LC tunable oscillators – Multivibrators- Monostable and astable – comparators – square wave and triangular wave generators- Voltage regulators. (CO2)</p>	12
III	<p><b>Communication Electronics</b></p> <p>Introduction to communication system – Need for modulation – Amplitude modulation – Generation of AM waves – Demodulation of AM waves – DSBSC modulation. Generation of DSBSC waves. Coherent detection of DSBSC waves, SSB modulation, Generation and detection of SSB waves. Vestigial sideband modulation, Frequency Division Multiplexing (FDM). (CO3)</p>	12
IV	<p><b>Digital Electronics</b></p> <p>Combinational Logic gates- Decoder- encoders- Multiplexer (data selectors)- application of multiplexer - De multiplexer (data distributors), Sequential Logic gates- Flip-Flops; the R-S Flip – Flop, JK Flip-Flop – JK master slave Flip-Flops – T- Flip – Flop – D Flip – Flop , Registers; Buffer registers- Shift registers – synchronous and asynchronous counters, application of counter. (CO4)</p>	12
V	<p><b>Microprocessors</b></p> <p>Introduction to microcomputers – Input /Output devices – ALU, Timing and Control Unit – registers memory – Pin configuration Description- Architecture and its operations – Address and Data Busses – generating control signals – instruction set – addressing modes- assembly language Programs – looping, counting and indexing – counters and timing delays – stack and subroutine. (CO5)</p>	12

**Text and Reference Books:**

1. Op-Amps & Linear integrated circuits, RAMAKANTHA.GAYAKWAD (PHI).

2. Electronic Communication Systems, George Kennedy (PHI)
3. Semiconductor Electronics, A.K. SHARMA (New Age International Publishers).
4. Fundamentals of Digital Circuits, A. ANANDAKUMAR, (PHI).
5. Digital principles and applications, MALVINO AND LEECH (TMH).

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Quiz

**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – I Semester**  
**Course Code: 22PH1T4 Title: ELECTRONICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

**Answer All Questions 5x4=20M**

- 1 (A) Explain the construction of differential amplifier  
(Or)  
(B) What are applications of differential amplifier ?  
CO1 L1
- 2 (A) Discuss the typical Op-Amp block diagram  
(Or)  
(B) What are the applications of operational amplifier ?  
CO2 L1
- 3 (A) Explain modulation and de modulation with examples  
(Or)  
(B) Discuss frequency division multiplexing  
CO3 L2
- 4 (A) Explain the construction and working of D and T- flip flops  
(Or)  
(B) What are the application for shift registers  
CO4 L2
- 5 (A) Explain stack and sub routine.  
(Or)  
(B) What are the addressing modes of 8085 MP?  
CO5 L2
- SECTION - B**
6. (A) Discuss the AC analysis of differential amplifier  
(Or)  
(B) With the help of neat circuit diagram explain the working of voltage-series feedback amplifier and  
derive expression for closed loop voltage gain  
CO1 L2
7. (A) Discuss the construction and working of Integrator  
(Or)  
(B) Explain the construction and working of RC-phase shift oscillator  
CO2 L2
- 8 (A) Write a note on generation and detection of AM waves  
(Or)  
(B) What are the different methods to produce SSB waves? Explain.  
CO3 L2
- 9 (A) Explain the construction and working of JK flip flop  
(Or)  
(B) Discuss the construction and working of synchronous counters.  
CO4 L2
- 10 (A) Discuss the architecture of 8085 micro processor  
CO5 L2

(Or)

(B) Explain the instruction set and addressing modes of 8085

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**