M. Sc. I Year		MPH-C204			Semester-II
		ELECTRONIC COMPONENTS & CIRCUITS			
Total Lectures	Time Allotted for End Semester Examination	Marks Allotted for Continuous Assessment	Marks Allotted for End Semester Examination (ESE)	Maximum Marks (MM)	Total Credits
60	**3 Hrs**	**30**	**70**	**100**	**04**

NOTE: The question paper shall consist of three sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer type questions of 6 marks each and student shall be required to attempt any five questions. Sec.-B shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllbus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

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Learning Objective:

This course presents the basic principles of circuit analysis and design, the basic concepts and characteristics of the electronic devices and circuits. It provides information to the students about the electronic components like diodes, transistors etc. in detail. In particular, this course offers the various interesting features associated with a variety of diodes like Zener diode and filed effect transistors (FETs). The OP-AMP theory and their circuits as well as oscillators and voltage regulators are also an important part of this course. In total, the course will provide an opportunity to students to practice in the experimental setup, measurement, and analysis of basic electronic devices and circuits along with the knowledge of switching circuit.

UNIT-I

REVIEW

Network & network theorems, Diode circuits-Rectifiers & smoothing circuits, Voltage multipliers, Limiters & clampers, Photodiode and LED, Zener diode, Varacter diode and tunnel diode, Transistor fundamentals, Transistor biasing, CE and CC amplifier and their small signal equivalanet circuits. **(12 Lectures)**

UNIT-II

FIELD EFFECT TRNASISTER (FET) AND FREQUENCY EFFECTS

FET and MOSFET device chracteristics, FET biasing, FET amplifier, Lead and lag networks, Miller's theorem, High frequency FET and BJT analysis, Bode frequency response plots, Amplifier frequency response. **(12 Lectures)**

UNIT-III

OP-AMP THEORY WITH NEGATIVE FEED BACK

The differrential amplifier, DC and AC analysis of a differential amplifier, CMMR, The OP-AMP, OP-AMP DC offset characteristics, Freuqncy response, Slew rate and power bandwidth, Types of negative feedback: Non–inverting voltage feed back, Effect on input and output impedences, Non–inverting current feedback, Inverting voltage and current feed back, Band width, Closed loop gain and BW. **(12 Lectures)**

UNIT-IV

OP-AMP CIRCUITS

Inverting amplifier, Non-inverting amplifier, Summing amplifier, Active filters, Comparators, The Schmitt trigger, Integrator, Differentiator, Waveform conversion, Waveform generator, Current to voltage and voltage to current converters, Low pass, band pass and band reject filters, Brief study of timer 555. **(12 Lectures)**

UNIT-V

THE OSCILLATORS, VOLTAGE REGULATORS AND THYRISTORS

The positive feedback and oscillations, Wein bridge oscillator, RC and LC oscillators, The unwanted oscillations and stability, Multivibrators.

Zener diode regulators, transistor series voltage regulators, Negative feedback voltage regulators, Transistor shunt voltage regulator, The SCR and its applications, UJT and its applications. **(12 Lectures)**

Text Books / Reference Books

1. Solid State Electronics - Ben G. Streetman, PHI
2. Semiconductor Devices-Physics and Technology- S. M .Sze Wiley (1985)
3. Introduction to Semiconductor devices - M.S. Tyagi, John Wiley & Sons
4. Electronic Devices & Circuits- G.K. Mithal
5. Electronic Principles (3/e)- A.P. Malvino, TMH
6. Op-Amps & Linear integrated circuits - Ramakanth A. Gayakwad, PHI, Second Edition, 1991.

Learning outcomes:

After the completion of the course, students will be able to get an expertise necessary to work with an electronic industry. With the knowledge to work with various circuits and devices like an opto-ectronic device, students are get familiar with the process like the conversion of energy and light to electrical energy/signals. The study of semiconductor devices in diverse context makes the base of student in the electronic field. Moreover, the study of Zener diode tells a student that how it acts as a voltage regulator and how to control the voltage. By the end of this course, the students should have fully acquired reasonable proficiency in the analysis and design of basic electronic circuits.