

Letter No: 112/DoP/BBAU/2020
Date: 20/11/2020

NOTICE

This is to inform to all concerned that the Department of Physics is offering the following one (01) optional paper under Open Elective Course in Ist Semester. This can be opted by any student under the Choice Based Credit System (CBCS) being followed by the University. Refer to Notice Board of Department of Physics for time table & other details. **Dr. Devedra Singh**, Department of Physics is student's advisor.

The details of the paper and the syllabus are as follows:

Course Code	Course Title	Maximum Marks				Credit
		End Semester	Sessional			
			Test-I	Test-II	Presentation/ Attendance/ Class Performance	
PHM-104	Electronics -I	70	10	10	10	4

Head
Department of Physics

Copy to:

1. A.R. to V.C. office for kind information of the Hon'ble Vice Chancellor, BBAU, Lucknow
2. Dean (Academic Affairs), BBAU, Lucknow.
3. All Deans with a request to give it a wide publicity among the stakeholders of all Departments under their Schools.
4. P.S to Registrar, BBAU, Lucknow.
5. S.O. to COE, BBAU, Lucknow.
6. Notice Board, Department of Physics, BBAU, Lucknow.
7. I/C University Website for its uploading on University Website in Public Notices link.

Head
विभागाध्यक्ष
Department of Physics
Head

भौतिकी विभाग
Deptt. of Physics

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Department of Physics
School for Physical & Decision Sciences
Babasaheb Bhimrao Ambedkar University.

Semester: First

1. Session: 2020-21
2. Course Title: Electronics -I
3. Course Code: PHM-104
4. Credits: 4
5. Lecture: 9:30 am to 10:30 am (Monday to Thursday)

Unit I

Physics of Devices: p-n junction, abrupt junction-band structure-thermal equilibrium- depletion region depletion capacitance current and voltage characteristics BJT-band structure-transistor action static characteristics. MOS structure MOSFET working MOSFET characteristics width of depletion region junction capacitance threshold voltage. Metal semiconductor contacts: ohmic and schottky contacts. Principle of operation of photo electronic devices: photoconductor efficiency current gain response time. Effect of light on I-V characteristics of a junction photo device, principle and working of a photodiode, light emitting diode (LED): principle, working and factors affecting the efficiency.

Unit II

Transistor Circuits: Common base configuration-IV characteristics, alpha equivalent, circuit-Common collector configuration (the emitter follower) input and output impedances gain; Common emitter configuration- IV characteristics, beta of a transistor base bias with single supply gain. Load lines for CE connection, dc load line, ac load line, optimum operating point. Push-pull amplifier. The Darlington pair. Astable multivibrator using transistors, voltage regulator using transistors, transistor difference amplifiers four configurations, analysis of dual input and dual output configuration, CMRR-common mode gain, difference mode gain.

Unit III

Operational Amplifiers: Introduction, block diagram, ideal characteristics, comparison with 741 Operational amplifier as a open loop amplifier, Limitations of open loop configuration, Operational amplifier as a feedback amplifier, Closed loop again, input impedance, output impedance of inverting and non-inverting amplifiers, Voltage follower, Differential amplifier, voltage gain. Applications of op-amp: Linear applications Phase and frequency response of low pass, high pass and band pass filters (first order), inverting and non-inverting configurations, summing amplifier, subtractor, ideal and practical differentiator and integrator. Non-linear applications: comparators, positive and negative clippers.

Unit IV

Digital Circuits: Review of gates (AND, OR, NAND, NOR, NOT, EX-OR), Boolean laws and theorems simplification of SOP equations, Simplification of POS equations, Simplification using Karnaugh Map technique (4 variables), conversion of binary to Grey code, Flip flops: Latch using NAND and NOR gates, RS flip flop, clocked RS flip flop, JK flip flop, JK master slave Flip Flop—racing- Shift Registers, Counters: Ripple counters- truth table, timing diagram, Synchronous counters-truth table, timing diagram, Decade counter.

References:

1. P. Horowitz and W. Hill, *The Art of Electronics*.
2. J. Millman and A. Grabel, *Microelectronics*.
3. J.J. Cathey, *Schaum's Outline of Electronic Devices and Circuits*.
4. M. Forrest, *Electronic Sensor Circuits and Projects*.
5. W. Kleitz, *Digital Electronics: A Practical Approach*.
6. J.H. Moore, C.C. Davis and M.A. Coplan, *Building Scientific Apparatus*