



FIRST-YEAR OF BACHELOR OF SCIENCE MAJOR PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE-ELECTRIC CIRCUITS, MODERN PHYSICS &
SEMICONDUCTORS
SEMESTER-II, W.E.F. 2023-2024

**RECOMMENDED BY THE BOARD OF STUDIES IN PHYSICS
AND
APPROVED BY THE ACADEMIC COUNCIL**

Devrukh Shikshan Prasarak Mandal's

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and
Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal.Sanameshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No: **03 dated 8 July 2023**

| | | |
|---|---|--|
| Name of the Implementing Institute | : | Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804, |
| Name of the Parent University | : | University of Mumbai |
| Name of the Programme | : | Bachelor of Science |
| Name of the Department | : | Physics |
| Name of the Class | : | First Year |
| Semester | : | Second |
| Paper | : | II |
| No. of Credits | : | 02 |
| Title of the Course | : | Electric Circuits, Modern Physics and Semiconductors |
| Course Code | : | S107PHT |
| Name of the Vertical in adherence to NEP 2020 | : | Major and Minor |
| Eligibility for Admission | : | Any 12 th Pass seeking Admission to Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra |
| Passing Marks | : | 40% |
| Mode of Assessment | : | Formative and Summative |
| Level | : | UG |
| Pattern of Marks Distribution for SEE and CIA | : | 60:40 |
| Status | : | NEP-CBCS |
| Implemented from Academic Year | : | 2023-2024 |
| Ordinances /Regulations (if any) | : | |

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College, Devrukh (An Autonomous College Affiliated with University of Mumbai)

Syllabus for First Year of Bachelor of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER-II

Paper No.– Physics Paper – II

Course Title: Electric Circuits, Modern Physics

No. of Credits - 02

And Semiconductors

Type of Vertical: Major and Minor

COURSE CODE: S107PHT

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to...

| Course Learning Outcome No. | Blooms Taxonomy | Course Learning Outcome |
|-----------------------------|-----------------|--|
| CLO-01 | Understand | Understand the Ohms law, KCL and KVL |
| CLO-02 | Understand | Solve problems related to Thevenin's / Norton's theorem and LR, CR circuits |
| CLO-03 | Understand | Understand the basics of radioactivity and solve numerical problems related to it |
| CLO-04 | Understand | Understand various atomic models and concepts of Quantum mechanics |
| CLO-05 | Evaluate | Summarize the Semiconductor material characteristics and behavior of p-n junction |
| CLO-06 | Understand | Demonstrate the experiment of Bridge rectifier and Use of Transistor and its working |

Syllabus for First Year of Bachelor of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER-II

Paper No.– Physics Paper – II

Course Title: Electric Circuits, Modern Physics

No. of Credits - 02

And Semiconductors

Type of Vertical: Major and Minor

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| COURSE CONTENT | | | |
|-----------------------|---|----------------|------------------------|
| Module | Content | Credits | No. of Lectures |
| 1 | Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law Network Theorems –Thevenin's, Norton's, superposition and maximum power transfer theorem (Statements only) Atom models –Thomson, Rutherford and Bohr's postulates of H atom, velocity, radius & Energy of electron in nth Bohr orbit, hydrogen spectrum. de-Broglie hypothesis, Uncertainty principles, Compton Effect, Pair production, Matter waves, wave particle duality, Davisson-Germer experiment. | 01 | 15 |
| 2 | Semiconductors: Introduction, types of semiconductors- Intrinsic and extrinsic semiconductor, Doping, p & n types, p-n junction, depletion layer, forward and reverse bias. Diode characteristics, Half wave, Full wave and Bridge rectifiers, Rectification efficiency and ripple, Capacitor Filter, Zener diode as voltage regulator. BJT: Construction, doping levels and sizes of E, B and C, types and symbols, working of transistor. 4. Transient response of circuits –Behaviour and equations of capacitor and inductor. Step responses of CR, LR circuits, time constant and its significance | 01 | 15 |
| Total | | 02 | 30 |

References:

Unit- I

1. Arthur Beiser, Perspectives of Modern Physics : Tata McGraw Hill.
2. CR: D. Chattopadhyay, P C Rakshit , Electricity and Magnetism 7th Ed. New Central Book agency.
3. TT :B.L. Theraja and A.K. Theraja , A Textbook of Electrical Technology Vol. I , S. Chand Publication.

Unit-II

1. VKM: V K Mehta and R Mehta Electronics Principals, Multi-coloured Revised 11th Ed. reprint in 2012 ,S Chand.

Access to the Course

The course is available for all the students admitted for Bachelor of Science.

Methods of Assessment

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College, Devrukh (An Autonomous College Affiliated with University of Mumbai)

The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

Pattern of Evaluation

The Examination/Evaluation pattern shall be framed by the Board of Examination with its final approval from the Academic Council of the College.