



**Ramniranjan Jhunjhunwala College of Arts,  
Commerce and Science (Empowered Autonomous)  
Ghatkopar (W), Mumbai 400086**

**SYLLABUS FOR SEM - III**

**Program: B.Sc. Physics Open Elective**

**Course Code:  
Sem III : RJOEPHY231**

**Credit Based Semester System w. e. f. the  
Academic Year 2024 –2025**

**Syllabus for S.Y.B.Sc. Physics Major  
(Choice Based Credit System w. e. f. academic year 2024-25 in compliance with NEP 2020)**

The revised syllabus in Physics as per credit based system for the Sem 3 B.Sc. Course will be implemented from the academic year 2024–2025. The syllabus is for the Semester III, Other Elective (OE) offered by the Physics Department.

**Preamble:**

The systematic and planned curricula from these courses shall motivate and encourage learners to understand basic concepts of Physics and familiarize them with the physical phenomena happening around them.

**Objectives:**

- To develop analytical abilities towards real world problems.
- To familiarize with recent scientific and technological developments.
- To enrich knowledge through hands-on activities, study visits, etc.

Course code	Title	Credits	Remarks
	<b>Semester III</b>		
<b>RJOEPHY231</b>	<b>Visualizing Physics Around Us (Offline or online lectures)</b>	<b>2</b>	<b>Concepts of Physics will be explained without using any complicated Mathematics with emphasis on the phenomena happening around us.</b>
	<b>Visualizing Physics Around Us (Laboratory Demonstrations)</b>	<b>1</b>	<b>Experiments demonstrating various concepts will be performed. Students will document their observations but need not note down readings.</b>

## SEMESTER-III

### Course Outcomes:

On successful completion of this course students will be able to:

1. Understand basic concepts of Physics.
2. Better understand the physical phenomena in nature.

### Evaluation scheme:

All the evaluation will happen continuously in the form of tests, assignments, participation and other schemes with the permission and suggestions of the Examination Committee.

The evaluation scheme may be modified as per suggestions and instructions of the Exam Committee.

<b>RJOEPHY231: Classroom or online Lectures</b>	<b>30 hours</b>
<b>Module 1:</b> Units, Measurements and Vectors, Equilibrium, Uniform motion, Galilean relativity Dynamics, Circular and rotational motion, Conservation of momentum and energy, Fluids, Oscillations and Waves.	8 hours
<b>Module 2:</b> Sound, Doppler effect, acoustics, atomic theory of matter, temperature, thermal expansion, ideal gas law, heat transfer, First law of thermodynamics, human metabolism, heat engines.	6 hours
<b>Module 3:</b> Static electricity, insulators and conductors, semiconductors, electric field, applications of electrostatics in printers, xerox machines and molecular biology, electric current, power supplies (DC and AC), Ohm's law, superconductivity, magnetism, magnetic induction, EM Waves.	8 hours
<b>Module 4:</b> Light, Optics, reflection and refraction, rainbow, lenses, interference and diffraction, polarization, optical instruments, human eye, hologram, x-rays, atoms, molecules and nuclei, elementary particles, astrophysics and cosmology.	8 hours

<b>RJOEPHY231: Demonstration Experiments</b>	<b>30 hours</b>
<b>Module 1:</b> Hands on with Vernier calipers and micrometer screw gauge, Atwood Machine, Newton's cradle, Resonance, gyroscope,	6 hours

moment of inertia, lever and pulley systems, etc.	
<b>Module 2:</b> Helmholtz resonator, expansion of a ring and ball, linear expansion (bimetallic strip), sonometer, ideal gas equation, adiabatic and isothermal expansion, etc.	6 hours
<b>Module 3:</b> Static Electricity, field due to a magnet, curie temperature, Lenz's law, DC and AC currents, e/m by Helmholtz coil, electro-magnet, capacitor charging and discharging, etc.	6 hours
<b>Module 4:</b> Total internal reflection, prism and its turning point, mercury spectrum, dependence of deviation on the refractive index, lenses, optical fiber, polarization on reflection, interference and diffraction, camera, etc.	6 hours
<b>A visit to the Nehru Science Center</b>	6 hours

### References:

Douglas C. Giancoli, Physics Principles with Applications (7th Edition) Addison-Wesley (2013)

**Ramniranjan Jhunjunwala College ( Empowered Autonomous), Ghatkopar West**

**RULES AND REGULATIONS REGARDING ASSESSMENT AND  
EVALUATION**

**FOR FY UNDER NEP FROM A.Y. 2023-2024 ONWARDS-**

1. A learner appearing for first year examination under NEP will have a maximum of 22 credits and examinations will be of **maximum 550 marks**.
2. Courses having **2 credits, 3 credits and 4 credits** will have examinations of **50, 75, 100 marks** respectively.
3. **With regard to Major Course, Minor Course and OEC:** Continuous evaluation of 40-60 adopted under autonomy (2018) shall continue for all the courses; for the courses with 2 credits and 50 marks, Internal is of 20 marks (only one IA) and External 30 marks (SEE); while the courses with 3 credits and 75 marks, it is 25 marks (only one IA) and 50 marks (SEE). In case of courses of 100 marks, the break up of marks will be 40 marks (IA) and 60 marks (SEE).
4. **With regard to IKS, VSEC (VSC and SEC), AEC, VEC:** These will be of 2 Credits each and of 50 marks. Continuous evaluation of 40-60 wherein Internal is of 20 marks and SEE of 30 marks or Only one SEE of 50 marks or continuous evaluation of more than one test by the respective coordinating department or as directed by the EC.
5. **With regard to CC:** Vertical of CC shall also be more like a continuous evaluation where a student will be awarded marks on the basis of his / her participation in the co-curricular activities of the department / other departments / associations / extension activities / intercollegiate events and Jeevan Kaushal. A workbook will be provided to a student to keep a record of his / her participation and will be duly signed by the concerned teachers.
6. **Duration of examinations**
  - a. An IA exam of 20/25 marks shall be of duration of 30 minutes.
  - b. An SEE exam of 30 marks (offline) shall be of duration of 1 hour.
  - c. An SEE exam of 50 marks (offline) shall be of duration of 1 ½ hour.
  - d. An SEE exam of 50 marks (online MCQ) shall be of 60 minutes.
  - e. An SEE exam of 60 marks (offline) shall be of duration of 2 hours.
7. There shall be combined passing of Internals and SEE in a given paper with a minimum passing percentage of 40.
8. Appearing for SEE for every paper is compulsory irrespective of the performance in the Internals examinations. A student absent in SEE will be thus declared failing in a given subject.
9. There shall be provision for supplementary examination for the benefit of students who miss their SEE on grounds of medical emergency or representing college at the national level event or any other equivalent event with a special permission granted by the Head of the institution.

10. There shall be no Additional Examinations for any of the Semesters except for the Semester V wherein one chance of credit improvement in Semester V shall be given before the Learner appears for the final Semester VI Examination.
11. A learner appearing for first year exam under NEP shall have an examination of maximum 550 marks to which effect ATKT is allowed for maximum of 200 marks corresponding to failing in 3 / 4 courses but must have passed in at least one Theory course of Major / Minor. FOR SY AND TY-
12. For the SY (2023-2024) and TY (2023-2024 and 2024-2025) programs, 40 – 60 pattern of continuous evaluation continues. However, Internal 40% as 20 + 20 is revised from AY 2023-24 as 15 + 25 wherein, 15 marks of assignment and 25 marks of MCQs or any other mode of evaluation as decided by the respective departments shall be implemented. Rest of the Rules and Regulations continue as earlier.
13. Ordinances 5042A, 5043A & 5044A, 5045A, 5046A, 5048A & B, 5049A, 5050A and 0.229A adopted under autonomy are to be accepted as its under NEP. (Next Page)
14. **ORDINANCES ADOPTED ON EXAMINATIONS CONDUCTED UNDER AUTONOMY**

<b>ORDINANCE NUMBER</b>	<b>MATTER OF REFERENCE</b>
<b>5042A</b>	<b>Grace Marks for passing in each head of passing (Theory/ Practical/ Oral/ Sessional)</b>
<b>5043A, 5044A</b>	<b>Grace marks for getting higher Class/ Grade (Grade Jump)</b>
<b>5045A</b>	<b>Condonation</b>
<b>5046A</b>	<b>Moderation</b>
<b>5048A&amp;B</b>	<b>Amendments of Results (Due to errors, Due to fraud, malpractices etc.)</b>
<b>5049A</b>	<b>Appointment of paper setters, Examiners, Senior supervisors and conduct of examination etc.</b>
<b>5050A</b>	<b>Ordinance regarding Unfair means resorted to by the Student</b>
<b>0.229A</b>	<b>Benefit of 10 marks under NSS/ NCC/ LLLS/ SPORTS</b>

***Explanation:***

**Ordinance 5042A:** *the benefit of gracing of marks under the ordinance shall be applicable only if the candidate passes the entire examination of semester/year.*

**Ordinance 5043A, 44A:** *the benefit of gracing of marks under the ordinance shall be applicable only if the candidate passes in all the subjects and heads of the examination without the benefit of either gracing or condonation rules and shall be given for maximum of 1% of the aggregate marks of the examination or up to 10 marks, whichever is less.*

**Ordinance 5045A:** *the benefit of gracing of marks under the ordinance shall be applicable only if the candidate fails in only one head of passing and his/her deficiency of marks in such head of passing may be condoned by not more than 1% of the aggregate marks of the examination or 10% of the total number of marks of that head of passing in which he/she is failing, whichever is less. Condonation of deficiency of marks can be shown in the statement of marks in the form of asterisk and Ordinance number.*

**Ordinance 5046A:** *the ordinance shall be applicable as per the detailed scheme of moderation released by the University of Mumbai via its adaptation in totality. Where marks awarded by the moderator vary from those awarded by the original examiner, the marks awarded by the moderators shall be taken as final.*

**Ordinance 5048A & B:** *section (A) of the ordinance is applicable to the case where it is found that the result of an examination has been affected by errors, the Controller of Examination shall have power to amend such result provided the errors are reported/ detected within 6 months from the date of declaration.*

*Error means –*

- (a) Error in computer/ data entry, printing or programming and the like.*
- (b) Clerical error, manual or machine in totalling or entering of marks on mark list/ register.*
- (c) Error due to negligence or oversight of the examiner or any other person connected with evaluation, moderation and result preparation.*

*Section (B) of the ordinance is applicable in any case where the result of an examination has been ascertained and published and it is found that such result has been affected by any malpractices, fraud or any other improper conduct whereby an examinee has benefited and that such examinee has been party of privy to or connived at such malpractice, fraud or improper conduct.*

**Ordinance 5049A:** *the ordinance shall be applicable as per the guidelines of University of Mumbai.*

**Ordinance 5050A:** *the convener of the Unfair means committee shall take appropriate disciplinary action against the student/s using, attempting to use, instigating or allowing to use unfair means at the examination applying the ordinance as per the guidelines of University of Mumbai.*

**Ordinance 0.229A:** *the ordinance shall be applicable to the candidate for his/her satisfactory completion of NSS/NCC/DLLE/SPORTS. Benefits of 10 marks are shown in the Statement of Marks in the form of hashtag and Ordinance number.*

**Dr. Himanshu G. Dawda**  
**Nayak**  
**Principal, Chief Controller of Examination**

**Maj. Pravin G.**  
**Controller of Examination**