Estd. 1962
"A++" Accredited by NAAC (2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA
PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४
०२३१—२६०९४८७

Ref:SU/BOS/Science/495 **Date: 02/09/2024**

To,

The Principal,
All Concerned Affiliated Colleges/Institutions
Shivaji University, Kolhapur

Subject: Regarding Minor Change syllabi of B.Sc. Part-I (Sem.I & II) as per NEP-2020 (2.0) degree programme under the Faculty of Science and Technology.

Ref: SU/BOS/Science/876/ Date: 26/12/2023 & 350 Date:/24/06/2024 Letter.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the Minor Change syllabi, nature of question paper of B.Sc. Part-I (Sem.I & II) as per NEP-2020 (2.0) degree programme under the Faculty of Science and Technology.

B.Sc.Part-I (Sem. I & II) as per NEP-2020 (2.0)			
1.	B.Sc Part I Sugar Technology (Entire)	3.	B.Sc Part I Electronics
2.	B.Sc Part I Physics		

This syllabus, nature of question and equivalence shall be implemented from the academic year 2024-2025 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020@suk(Online Syllabus)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2024 & March/April 2025. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	5	Appointment Section A & B
2	Director, Board of Examinations and Evaluation	6	I.T.Cell /Computer Centre
3	The Chairman, Respective Board of Studies	7	Eligibility Section
4	B.Sc.-M.Sc. Exam Section	8	Affiliation Section (T.1) (T.2)
9	IQAC Cell		

Shivaji University Kolhapur

Accredited By NAAC with 'A^{++}' Grade

Syllabus for Bachelor of Science

Part-I

Physics

(NEP-2.0)

To be implemented from

June, 2024 onwards

Shivaji University, Kolhapur

NEP-2020 (2.0): Credit Framework for UG (B. Sc. I) Programme under Faculty of Science and Technology

B. Sc. I Physics

Level	Semester	COURSES			OE	VSC/SEC	AEC/ VEC/ IKS	OJT/FP/CEP/CC/ RP	Total Credit
		Course - I	Course - II	Course - III			IKS		
4.5	I	DSC-I (2) DSC-II (2) DSC Pract.-I (2)	DSC-I (2) DSC-II (2) DSC Pract.-I (2)	DSC-I (2) DSC-II (2) DSC Pract.-I (2)	OE -I (T/P) (2)		IKS-I (2) Introduction to IKS		
	Credits	4+2=6	4+2=6	4+2=6	2		2		22
	II	DSC-III (2) DSC-IV (2) DSC Pract.-II (2)	DSC-III (2) DSC-IV (2) DSC Pract.-II (2)	DSC-III (2) DSC-IV (2) DSC Pract.-II (2)	OE-II (T/P) (2)		VEC -I (2) (Democracy, Election and constitution)		
	Credits	4+2=6	4+2=6	4+2=6	2		2		22
1st Year Cum. Credits		8(T) + 4(P) = 12	8(T) + 4(P) = 12	8(T) + 4(P) = 12	2 + 2 = 4		2 + 2= 4		44
Exit option: Award of UG Certificate with 44 Credits									

Titles of papers for Basic Physics

Semester		Code	Paper No.	Title of paper
I		DSC-I	PHYSICS Paper-I	Mechanics
		DSC-II	PHYSICS Paper-II	Electricity and Magnetism I
		DSC-P-I	PHYSICS Practical I	Mechanics & Electricity and Magnetism I
		OE	OE -I (T/P) (2)	OE I: Household Electrical and Electronic Appliances -I (गृहउपयोगी इलेक्ट्रिकल आणि इलेक्ट्रॉनिक उपकरणे-I)
II		DSC-III	PHYSICS Paper-III (Major)	Properties of Matter
		DSC-IV	PHYSICS Paper-IV (Major)	Electricity and Magnetism II
		DSC-P-II	PHYSICS Practical II (Major)	Properties of Matter & Electricity and Magnetism II
		OE	OE -II (T/P) (2)	OE II: Household Electrical and Electronic Appliances (गृहउपयोगी इलेक्ट्रिकल आणि इलेक्ट्रॉनिक उपकरणे-II)

Papers of Astrophysics

Semester		Code	Paper No.	Title of paper
I		DSC-I	ASTROPHYSICS Paper-I	Fundamentals of Astronomy-I
		DSC-II	ASTROPHYSICS Paper- II	Fundamentals of Astrophysics-I
		DSC-P-I	ASTROPHYSICS Practical-I	Astrophysics and Astronomy-I
II		DSC-III	ASTROPHYSICS Paper-III	Fundamentals of Astronomy-II
		DSC-IV	ASTROPHYSICS Paper- IV	Fundamentals of Astrophysics -II
		DSC-P-II	ASTROPHYSICS Practical-II	Astrophysics and Astronomy-II

SHIVAJI UNIVERSITY, KOLHAPUR
B. Sc. Part I Physics NEP Syllabus with effect from June 2024
B. Sc. I Semester I
DSC-I PHYSICS Paper-I
Mechanics
Theory: 30 Hours
(Credits: 02)

1. Vector algebra (9 hours)

Revision - (Vector Algebra: Components of vectors and unit vector, Addition and subtraction of vectors), Scalar product, Vector product, and their properties, Scalar triple product and its physical significance, Properties of scalar triple product, Vector triple product, Properties of vector triple product.

2. Gravitation (6 hours)

Newton's law of gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved), Kepler's laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS).

3. Momentum and energy (7 hours)

Conservation of linear and angular momentum, work and energy theorem, conservation of energy (Single particle), Dynamics of a system of particles (linear momentum, angular momentum and energy), Center of mass, Motion of rockets (qualitative treatment only).

4. Rotational motion (8 hours)

Angular velocity, Angular momentum, and torque, Kinetic energy of rotation and moment of inertia, Moment of inertia of a spherical shell and solid cylinder (only about axis of symmetry), Motion of spherical shell and solid cylinder rolling down an inclined plane.

Reference Books

1. Mathematical Physics -B. S. Rajput, 25th edition 2013, Pragati Prakashan, Meerut.
2. Mechanics – D. S. Mathur, 2009, S. Chand & Company Ltd., New Delhi.
3. Mathematical Physics – B. D. Gupta, 3rd edition, 2009, Vikas Publishing House Pvt. Ltd., New Delhi.
4. Mathematical Physics – P. P. Gupta, R. P. S. Yadav, G. S. Malik, 4th edition 1983-84, Kedar Nath Ram Nath, Meerut, Delhi.
5. University Physics. FW Sears, MW Zemansky and HD Young, 13/e, 1986, Addison - Wesley.
6. Mechanics Berkeley Physics course, V.1: Charles Kittel, et. Al. 2007, Tata McGraw Hill.
7. Physics – Resnick, Halliday& Walker 9/e, 2010, Wiley Eastern Ltd, New Delhi.
8. Engineering Mechanics, Basudeb Bhattacharya, 2ndedn., 2015, Oxford University Press.

Course Outcome

- Students are able to understand and identify scalar and vector physical quantities in mechanics
- Students are able to understand and apply vector algebraic methods to elementary exercises in mechanics
- Students are able to understand and apply basic concepts of rotational motion
- In general, students are capable of correlating the above concepts and methods in mechanics to both theoretical and experimental domains revealing analytical as well as numerical skills

SHIVAJI UNIVERSITY, KOLHAPUR
B. Sc. Part I Physics NEP Syllabus with effect from June 2024
B. Sc. I Semester I
DSC-II PHYSICS Paper-II

Electricity and Magnetism I

Theory: 30 Hours
(Credits: 02)

1. Vector analysis (7 hours)

Del operator, Gradient of a scalar field and its physical significance, Divergence of vector field and its physical significance, Curl of vector field, Line, surface and volume integral (definitions only), Gauss divergence theorem and Stoke's theorem (statements only).

2. Electrostatics (8 hours)

Coulomb's law, Electrostatic field, electric flux, Gauss's theorem of electrostatics, electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere, calculation of electric field from potential.

3. Dielectrics (6 hours)

Dielectric medium, Polarisation vector, Displacement vector, electric vector, Relation between E, P, and D vectors, Electric susceptibility of dielectrics.

4. Magnetostatics (9 hours)

Introduction to magnetization and intensity of Magnetization, Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law.

Reference Books

1. Mathematical Physics -B. S. Rajput, 25th edition 2013, Pragati Prakashan, Meerut.
2. Mathematical Physics – B. D. Gupta, 3rd edition, 2009, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Mathematical Physics – P. P. Gupta, R. P. S. Yadav, G. S. Malik, 4th edition 1983-84, Kedar Nath Ram Nath, Meerut, Delhi.
4. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
5. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford University Press.
6. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
7. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
8. Electricity and Magnetism, Khare and Shrivastav. Atma Ram & Sons, Delhi, 1976
9. University Physics 9th Edition, Young and Freedman.

Course Outcome

- Students are able to understand the physical significance of gradient, divergence and curl
- Students are able to apply concepts in vector calculus such as gradient, divergence and curl related to vector and scalar fields using Gauss, Stokes and green`s theorem
- Students are able to understand and apply concepts of electrostatic field, potential to point charges, electric dipole and geometrically regular charged bodies
- Students are able to understand and apply concept of energy density in electric field
- Students are capable of applying above concepts to solve numerical exercise in electrostatics

SHIVAJI UNIVERSITY, KOLHAPUR
B. Sc. Part I Physics NEP Syllabus with effect from June 2024
B. Sc. I Semester I
DSC PHYSICS Practical I
(Credits: 02)
Group I

1. Measuring dimensions of the body/object by using a Vernier caliper and screw gauge.
2. To determine the MI of the disc using an annular ring.
3. To determine the MI of the flywheel.
4. To determine the modulus of rigidity by dynamic method.
5. To determine 'g' by Bar Pendulum.
6. To study the motion of a spring and calculate (a) spring constant (b) value of g.
7. To determine 'g' by Kater's Pendulum.
8. Exponential decay of amplitude of simple pendulum.

Group II

1. Use of multimeter.
2. To study different types of resistors and capacitors.
3. Series and Parallel connections of resistances.
4. Verification of Ohm's law.
5. To determine the resistance of the galvanometer using PO box.
6. Measurement of field strength B and its variation in a solenoid (Determine dB/dx).
7. To determine the frequency of A. C. mains by sonometer (magnetic material of wire).
8. To determine the frequency of A. C. mains by sonometer (non-magnetic material).

Reference Books:

1. Advanced Practical Physics for students, B. L. Flint & H. T. Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
4. College Practical Physics – Khanna and Gulati (S. Chand and Co. Ltd, Delhi).
5. Practical Physics – Gupta and Kumar (Pragati Prakation Meerat)
6. Advanced Level Practical Physics – J.M. Nelcon, J.M. Ogloom (EIBS).
7. Engineering Practical Physics- S. Panigrahi & B. Mallick,2015, Cengage Learning India Pvt. Ltd.
8. B.Sc. Practical Physics - Harnam Singh and P S Hemne, S Chand publications.

Course Outcome

- Apply fundamental mechanical principles: Utilize concepts like moment of inertia, simple harmonic motion, and gravity to design and conduct experiments, analyzing and interpreting results.
- Develop experimental skills: Demonstrate competence in setting up apparatus, taking precise measurements, and calculating uncertainties, understanding limitations and sources of error.
- Explore electrical components and circuits: Classify and characterize resistors, capacitors, and galvanometers based on their properties and roles in circuits, measuring resistance and magnetic field strength.
- Investigate wave phenomena and their interactions: Analyze the behavior of sound waves in different media (magnetic vs. non-magnetic), employing a sonometer to determine frequency and comprehend the influence of material properties.

SHIVAJI UNIVERSITY, KOLHAPUR
B. Sc. Part I Physics NEP Syllabus with effect from June 2024
B. Sc. I Semester II
DSC-III PHYSICS Paper-III

Properties of Matter

Theory: 30 Hours
(Credits: 02)

1. Elasticity (9 hours)

Introduction (Hooke's law, Elastic moduli-Relation between elastic constants), Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants, Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beam supported at both the ends (without considering weight of beam). Torsional oscillation, Determination of Rigidity modulus and moment of inertia - q, η and σ by Searle's method

2.Surface tension (6 hours)

Surface tension (definition), Angle of contact and wettability, Relation between surface tension, excess of pressure and radius of curvature, Experimental determination of surface tension by Jaeger's method, Applications of surface tension.

3. Fluid dynamics (8 hours)

Introduction, Concept of viscous force and viscosity, Coefficient of viscosity, Steady and Turbulent flow, Reynolds number, Equation of continuity, Bernoulli's Theorem, practical applications: (i) Law of hydrostatic pressure (ii) Filter pump (iii) Speed of efflux (iv) Venturytube

4. Viscosity (7 hours)

Introduction, Ideal and viscous fluids, Flow of liquid through capillary tube, Poiseuille's equation, Experimental determination of coefficient of viscosity of liquid by Poiseuille's method, effect of temperature and pressure on viscosity of liquid.

Reference Books

1. Physics – S.G. Starling and Woodal Longmams and Green Co. Ltd.
2. Elements of properties of matter – D.S. Mathur, Shamlal Charitable Trust New Delhi.
3. A text Book of properties of matter–N.S. Khare and S. Kumar. Atmaram and Sons New Delhi.
4. Physics Vol. I and Vol. II–David Halliday and Robert Resnik, Willey Eastern Ltd, New Delhi.
5. Concepts of Physics -H.C. Varma -Bharati Bhavan Publishers

SHIVAJI UNIVERSITY, KOLHAPUR

B. Sc. Part I Physics NEP Syllabus with effect from June 2024
B. Sc. I Semester II
DSC-IV PHYSICS Paper-IV

Electricity and Magnetism II

Theory: 30 Hours
(Credits: 02)

1. A.C. circuits (10 hours)

Complex numbers and their application in solving a. c. series LCR circuit using j operator and phasor diagram, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Resonance in LCR Parallel circuit, complex Impedance, Reactance, Admittance, and Susceptance, Examples of series and parallel resonance, A.C.Bridge - Owen's Bridge Q-factor (definition only).

2. Electromagnetic induction (5 hours)

Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field.

3. Ballistic galvanometer (7 hours)

Construction and working of B. G., expression for charge flowing through ballistic galvanometer, Correction for damping in galvanometer, Constants of the ballistic galvanometer.

4. Magnetic materials and their properties (8 hours)

Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. diamagnetic, paramagnetic, ferromagnetic: Hysteresis and hysteresis curve, ferrimagnetic and anti-ferromagnetic materials.

Reference Books

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
2.Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford University Press.
3. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
5. Electricity and Magnetism, Khare and Shrivastav. Atma Ram & Sons, Delhi, 1976
6. University Physics 9th Edition, Young and Freedman.
7. Foundations of Electromagnetic Theory, Rritz and Milford. Pearson Publication
8. Electricity and Magnetism, Gupta, Kumar and Singal

9. Basic Electronics and Liner Circuits, N. N. Bhargava, D. C. Kulshrestha and S. S. Gupta, Tata McGraw-Hill
10. Electronic Fundamentals and Applications, J. D. Ryder, Prentice-Hall of India Pvt. Ltd
11. Network theory and Filter Design, V. K. Aatre, New Age International Publisher
12. Principals of Electronics, V. K. Mehata, S. Chan

Course Outcome

- Students are able to understand importance of complex numbers in analysis of AC Circuits contacting Inductance(L) Capacitor(C) and Resistance (R) and their various configurations

- Students are able to define and apply the concepts in AC circuits such as Impedance (Z), reactance (XC and XL), Admittance, Susceptance and Quality Factor (Q)

- Students are able to understand and design AC bridge: Owen`s Bridge

- Students are able to understand basic working principle of Ballistic galvanometer

- Students are able to define constants of ballistic galvanometer

- Students are able to understand the explain the phenomenon of hysteresis in magnetism

- Students are able to discriminate different magnetic materials based on their characteristic properties

SHIVAJI UNIVERSITY, KOLHAPUR
B. Sc. Part I Physics NEP Syllabus with effect from June 2024
B. Sc. I Semester II
DSC PHYSICS Practical II
(Credits: 02)
Group I

1. To determine the coefficient of viscosity by Poiseuille's method.
2. To determine Y by method of bending.
3. Surface tension by Jaeger's method.
4. To determine the viscosity of viscous liquid by the Stokes method.
5. To determine Poisson's ratio of rubber (rubber tube).
6. Young's modulus of the material of bar by vibration.
7. To determine the time period and constant of the logarithmic decrement of B. G.
8. To determine constants of B. G.

Group II

1. To determine the impedance of the series LCR circuit.
2. To study the series LCR circuit.
3. To study a parallel LCR circuit.
4. Verification of Kirchhoff's current law.
5. Verification of Kirchhoff's voltage law.
6. Owen's Bridge- To determine the resistance of a coil by DC balance.
7. Study of transformers.

Reference Books:

1. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

2. Advanced Practical Physics for students, B. L. Flint & H. T. Worsnop, 1971, Asia Publishing House.

3. Engineering Practical Physics- S. Panigrahi & B. Mallick,2015, Cengage Learning India Pvt. Ltd.

4. College Practical Physics – Khanna and Gulati (S. Chand and Co. Ltd, Delhi).

5. Practical Physics – Gupta and Kumar (Pragati Prakashan Meerat)

6. Advanced Level Practical Physics – J.M. Nelcon, J.M. Ogloom (EIBS).

7. B.Sc. Practical Physics - Harnam Singh and P S Hemne, S Chand publications.

8. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

Course Outcome

- Master mechanical measurements and principles: Utilize advanced techniques like Poiseuille's method, bending, and vibration to measure viscosity, Young's modulus, and Poisson's ratio, demonstrating understanding of fluid dynamics and elasticity.

- Analyze surface tension and its impact: Employ Jaeger's method to investigate surface tension, recognizing its role in various phenomena and its dependence on material properties.

- Explore AC circuits and impedance: Analyze the behavior of series and parallel LCR circuits, measuring impedance and comprehending the influence of individual components (L, C, R) on resonance and phase relationships.

- Investigate bridge circuits and transformers: Utilize a B.G. bridge to determine unknown resistances and delve into the principles and applications of transformers, understanding their role in AC power transmission and voltage transformation

Shivaji University Kolhapur
B.Sc. Part-I (NEP 2020), Syllabus applicable from June, 2024
B.Sc. Part-I Semester I
OE I: Household Electrical and Electronic Appliances-I (Practical)
Credits: 2 (60 hours)

Group I

1. Identify and draw the symbols of various electrical components.
2. Identify and draw the symbols of various electronic components.
3. Use of various tools –multi-meter, cutter, different screwdrivers, testers, electronic gun
4. Testing of electrical components.
5. Testing of electronic components.
6. Make series connections of resistances validate via experimental proof.
7. Make parallel connections of resistances validate via experimental proof.

Group II

8. Identify and verify - various DC voltage sources
9. Make series connections for D. C. power supply and validate via experimental proof.
10. Make parallel connections for D. C. power supply and validate via experimental proof.
11. Prepare and test3V and 5V AC voltages power supply.
12. Prepare and test variable AC voltage power supply
13. Prepare and test 3V and 6V DC voltage power supply
14. Prepare and test variable DC voltage power supply
15. Prepare and test the regulated power supply.

References

1. Electrical Wiring- O. B. Choudhari
2. Electrical Wiring and electrical technology - O. B. Choudhari

शिवाजी विद्यापीठ कोल्हापूर

बी.एस्सी. भाग- I (NEP 2020) , जून, 2024 पासूनलागू अभ्यासक्रम

बी.एस्सी. भाग- I सेमिस्टर I

OE I: गृहउपयोगी इलेक्ट्रिकल आणि इलेक्ट्रॉनिक उपकरणे-I (प्रात्यक्षिक)

Credits: 2 (६० तास)

ग्रुप १

1. विविध इलेक्ट्रिकल कॉम्पोनन्टची चिन्हे ओळखा आणि काढा.

2. विविध इलेक्ट्रॉनिक कॉम्पोनन्टची चिन्हे ओळखा आणि काढा.

3. मल्टी-मीटरचा, कटर, वेगवेगळ्या प्रकारचे स्क्रूड्रायव्हर्स, टेस्टर्स, इलेक्ट्रॉनिक गन इत्यादी साधनांचा वापर.

4. इलेक्ट्रिकल कॉम्पोनन्ट टेस्ट करणे.

5. इलेक्ट्रॉनिक कॉम्पोनन्ट टेस्ट करणे.

6. रेजिस्टन्सची सिरीज जोडणी करणे व प्रात्यक्षरीत्या पडताळणे.

7. रेजिस्टन्सची पॅरलल जोडणी करणे व प्रात्यक्षरीत्या पडताळणे.

ग्रुप २

8. विविध डी. सी. व्होल्टेज स्त्रोत ओळखणे आणि पडताळणे.

9. डी. सी. पॉवर सप्लायची सिरीज जोडणी करणे व प्रात्यक्षरीत्या पडताळणे.

10. डी. सी. पॉवर सप्लायची पॅरलल जोडणी करणे व प्रात्यक्षरीत्या पडताळणे.

11. 3 V आणि 5 V ए. सी. व्होल्टेज पॉवर सप्लाय तयार करणे आणि तपासून पाहणे.

12. व्हेरिएबल ए. सी. व्होल्टेज पॉवर सप्लाय तयार करणे आणि तपासून पाहणे.

13. 3 V आणि 6 V डी. सी व्होल्टेज पॉवर सप्लाय तयार करणे आणि तपासून पाहणे.

14. व्हेरिएबल डी. सी. व्होल्टेज पॉवर सप्लाय तयार करणे आणि तपासून पाहणे.

15. रेग्युलेटेड पॉवर सप्लाय तयार करणे आणि तपासून पाहणे.

संदर्भपुस्तके

1. इलेक्ट्रिकल वायरिंग- ओ.बी. चौधरी

2. इलेक्ट्रिकल वायरिंग आणि इलेक्ट्रिकल तंत्रज्ञान - ओ.बी. चौधरी

Shivaji University Kolhapur
B.Sc. Part-I (NEP 2020), Syllabus applicable from June, 2024
B.Sc. Part- I Semester II
OE II: Household Electrical and Electronic Equipment -II (Practical)
Credits: 2 (60 Hours)

Group I

1. Teat and repair DC power supply
2. Test and repair AC power supply.
3. Make and test the connection of the table lamp.
4. Make and test the connections of the extension box.
5. Test and repair basic fluorescent tube lights.
6. Test and repair the electronic tube light system.
7. Testing and repairing of electrical Irons
8. Testing and repairing of electronic Irons

Group II

9. Testing and repairing of electrical Bell
10. Testing and repairing of electronic Bell
11. Testing and repairing of decoration LED lamps and strings - I. (Series connection)
12. Testing and repairing of decoration LED lamps and strings - II (Parallel connection)
13. Testing and repairing battery (cell) torch.
14. Testing and Repairing of emergency torch - I (Single light)
15. Testing and Repairing of an emergency torch - II (multilight)
16. Testing and repairing electronic toys/ electronic watch/remote

References

1. Electrical Wiring- O. B. Choudhari
2. Electrical Wiring and electrical technology - O. B. Choudhari

शिवाजी विद्यापीठ कोल्हापूर

बी.एस्सी. भाग- I (NEP 2020) , जून, 2024 पासूनलागू अभ्यासक्रम

बी.एस्सी. भाग- I सेमिस्टर II

OE II: गृहउपयोगी इलेक्ट्रिकल आणि इलेक्ट्रॉनिक उपकरणे-II (प्रात्यक्षिक)

Credits: 2 (६० तास)

ग्रुप १

1. डी. सी. पॉवर सप्लायची चाचणी आणि दुरुस्ती.
2. ए. सी. पॉवर सप्लायची चाचणी आणि दुरुस्ती.
3. टेबल लॅम्पची जोडणी आणि चाचणी.
4. एक्स्टेंशन बॉक्सची जोडणी आणि चाचणी.
5. फ्लोरोसेंट ट्यूबलाइटची चाचणी आणि दुरुस्ती.
6. इलेक्ट्रॉनिक ट्यूबलाईटची चाचणी आणि दुरुस्ती.
7. इलेक्ट्रिकल इस्त्रींची चाचणी आणि दुरुस्ती.
8. इलेक्ट्रॉनिक इस्त्रीची चाचणी आणि दुरुस्ती.

ग्रुप २

9. इलेक्ट्रिकल बेलची चाचणी आणि दुरुस्ती.
10. इलेक्ट्रॉनिक बेलची चाचणी आणि दुरुस्ती.
11. सजावटीचे एल. ई. डी. दिवे/माळा यांची चाचणी आणि दुरुस्ती- I (सिरीज जोडणी).
12. सजावटीचे एल. ई. डी. दिवे/माळा यांची चाचणी आणि दुरुस्ती- II (पॅरलल जोडणी).
13. बॅटरी (ड्रायसेल) चाचणी आणि दुरुस्ती.
14. आपत्कालीन टॉर्चची चाचणी आणि दुरुस्ती - I (सिंगल लाईट).
15. आपत्कालीन टॉर्चची चाचणी आणि दुरुस्ती - II (मल्टी लाईट).
16. इलेक्ट्रॉनिक खेळणी/इलेक्ट्रॉनिक घड्याळ/रिमोट यांची चाचणी आणि दुरुस्ती.

संदर्भपुस्तके

1. इलेक्ट्रिकल वायरिंग- ओ.बी. चौधरी
2. इलेक्ट्रिकल वायरिंग आणि इलेक्ट्रिकल तंत्रज्ञान - ओ. बी. चौधरी

SHIVAJI UNIVERSITY, KOLHAPUR.
B. Sc. - I NEP Syllabus with effect from June, 2024
B. Sc. Part – I Semester-I
Astrophysics Paper-I
Credits: 2 (30 Hours)
Paper - I (Fundamentals of Astronomy-I)

Course Outcomes: -

- To understand the basic concepts of Astrophysics and Astronomy.
- Aim to give an in-depth understanding of the principles and methods of astrophysics to the student, and skilled to apply this understanding to a range of theoretical, observational, and practical problems, at a level appropriate for a professional scientist.

1. Introduction to Astronomy and Astrophysics (7 Hours)

Astronomy and Astrophysics, Importance of astronomy, Methods of astronomy and astrophysics, Scientific methods, History of astronomy (Babylonian, Greek, Indian etc).

2. Theories of Planetary motion (8 Hours)

Introduction, Ptolemy's astronomical work, Copernican heliocentric theory, Tycho Brahe theory, Newton's law of Gravitation, Kepler's laws and its explanation.

3. Celestial Coordinates (7 Hours)

Introduction, coordinate system, celestial sphere, terrestrial latitude and longitude, equator and poles.

4. Time and Calendar (8 Hours)

Introduction, Moon and its phases, moon, sun and stars as calendars, modern calendar, sidereal day, sidereal time, Apparent and Mean solar time, Sidereal Time Versus Solar Time.

SHIVAJI UNIVERSITY, KOLHAPUR.
B. Sc. - I NEP Syllabus with effect from June, 2024
B. Sc. Part – I Semester-I
Astrophysics Paper-II
Credits: 2 (30 Hours)
Paper - II (Fundamentals of Astrophysics-I)

1. Unraveling the Forces Binding the Universe (5 Hours)

Nuclear force, Electromagnetic force, Gravitational force, Weak forces, Dominant forces in the outer space

2. The Nature of Light (6 Hours)

Light as an electro-magnetic wave, Electromagnetic spectrum. Electromagnetic radiation from heated object (Wein's law), Photon and photon diffusion time. Doppler shift and its applications.

3. Basic Tools of Astronomers (12 Hours)

Optical telescopes-Galilean, Newtonian, Cassegrainian, Hubble space telescope, Magnifying power of telescope, Resolving power of telescope, Spectroscope (prism, grating), UV, IR, Radio, X-Ray and Gravitational waves astronomy, LIGO(qualitative).

4.Message of Star light (7 Hours)

The Atom, Atomic spectra-emission and absorption spectra (Fraunhofer lines), Molecular spectra, Spectrum of a star, Classification of stellar spectra based on temperature, Sun as a 'G' type star

SHIVAJI UNIVERSITY, KOLHAPUR.
B. Sc. - I NEP Syllabus with effect from June, 2024
B. Sc. Part – I Semester-II
Astrophysics Paper-III
Credits: 2 (30 Hours)
Paper - III (Fundamentals of Astronomy-II)

1. The Stellar distances (8 Hours)

Introduction, Measurement of terrestrial distances, Definition of parallax and Geocentric parallax, distance of moon, distance of planets, Trigonometric parallax of stars, Astronomical unit (light years and parsec).

2. Luminosity of stars (7 Hours)

Introduction, Luminosity of stars, magnitude scale, Luminosity measurement: 1) Visual method 2) Photographic method 3) Photoelectric method.

3. Constellations (7 Hours)

Introduction, Constellations – Aries, Pisces, Orion, Asterisms – summer triangle and Big Dipper (Saptarishi), hunter (Orion).

4. Comets, Asteroids &Meteoroids (8 Hours)

Introduction, Origin of Comets, Asteroids and Meteors, properties of Comets, Asteroids & Meteoroids, meteor & Meteorites, impacts on earth

SHIVAJI UNIVERSITY, KOLHAPUR.
B. Sc. - I NEP Syllabus with effect from June, 2024
B. Sc. Part – I Semester-II
Astrophysics Paper-IV
Credits: 2 (30 Hours)
Paper - IV (Fundamentals of Astrophysics-II)

1. The Hertzsprung-Russell (H-R) Diagram (6 Hours)
Color of glowing object, Luminosity and brightness, Population of stars, The Hertzsprung-Russell Diagram, Main sequence, Variable stars, Binary stars.

2. Nuclear Reactions in a Stars (5 Hours)
Nuclear Fission, Nuclear fusion, Thermonuclear reactions in stars: p-p chain reaction and Carbon Nitrogen Oxygen (CNO) cycle

3. Stellar evolution (8 Hours)
Life cycle of stars: Gravitational condensation (Protostar), Birth of a star, Maturity of a star, ageing of stars, electron degeneracy pressure, dependance of stellar evolution on mass (Chandrasekhar limit).

4. White Dwarfs, Neutron Stars and Black Holes (8 Hours)
Death of a small star: The white Dwarf, Death of a massive Star : The Supernova Explosion, Pulsars and Neutron stars, Black holes in space

Reference Books:

1) Astronomy: Fundamentals and Frontiers – Jastrow &Thomson.
2) Astrophysics (Stars & Galaxies) – K. D. Abhyankar
3) The Structure of Universe – JayantNaralikar.
4) Fundamental of Astronomy and Astrophysics – Michael Seed.
5) Introductory Astronomy and Astrophysics – Zeilik and Greogary.
6) A revision book of Astronomy and Astrophysics – RohanGharate
7)A textbook of Astronomy of astrophysics – MohitSharma and Suresh Chanra
8) Cosmic Adventure – JayantNaralikar.
9) Astronomy: A Physical Perspective - Marc L. Kutner
10) Stars, Life, Death and Beyond – A. K. Kimbhavi and JayantNaralikar.
11) Unfolding our universe – Lain Nicolson
12) An introduction to Cosmology – Jayant Vishnu Narlikar

SHIVAJI UNIVERSITY, KOLHAPUR.
B. Sc. - I NEP Syllabus with effect from June, 2024
B. Sc. Part – I Semester-I
Astrophysics and Astronomy Practical I
Credits: 2 (30 Hours)

Practical Course I (Sem I)

1. Solution of ordinary differential equations
2. To use idea of parallax to determine large distance
3. Lummer Brodhun Photometer (comparison of intensities)
4. Resolving power of telescope.
5. I-V Characteristics of solar cell and verification of inverse square law ofintensity
6. Study of Lissajous figures using CRO
7.Calibration of spectrometer
8. Study of Balmer lines

B. Sc. Part – I Semester-II
Astrophysics and Astronomy Practical II

Practical Course II (Sem II)

1. Numerical interpolation.
2. Constellation map drawings – a) Orion b) Ursa Major (Big Dipper) c) Auriga
d) Taurus.
3. Magnifying power of telescope.
4. Determination of Planck's constant using LED
5. Measurement of wavelength of given LASER source using diffraction grating
6. Velocity of sound using CRO and microphone
7. Measurement and identification of spectral lines
8. Band absorption spectrum of liquid ($KMnO_4$ solution)

B.Sc. I Syllabus (NEP-2020)

To be implemented from June 2024 onwards Semester I & II

Nature of Question paper

Total Marks 40

Q.1 Choose the correct alternatives **8 Marks**

a)

b)

c)

d)

e)

f)

g)

h)

Q.2. Attempt any TWO of the following (Out of Three) **16 Marks**

a)

b)

c)

Q.3. Answer any FOUR of the following (Out of SIX) **16 Marks**

a)

b)

c)

d)

e)

f)

B.Sc. I Syllabus (NEP-2020)

To be implemented from June 2024 onwards

Nature of Practical Examination

Total Marks 50

Scheme of Practical Examination for B. Sc. Part –I

1. Practical examination will be conducted semester wise.
2. Practical examination will be conducted for one day per batch.
3. The examination will be conducted in two sessions per day and each session will be of three hours duration.
4. Every candidate should perform one experiment each from Group I and Group II.
5. At least eighty percent practical should be completed by the student.
6. The marks distribution for practical is as below

Practical groups	**Marks**
Group I	20
Group II	20
Certified laboratory journal	10
Total Marks	**50**

B.Sc. I Syllabus (NEP-2020)

To be implemented from June 2024 onwards

Nature of Practical Examination

Total Marks 50

Scheme of Practical Examination for B. Sc. Part –I (OE)

1. Practical examination will be conducted semester wise.
2. Practical examination will be conducted for one day per batch.
3. The examination will be conducted in two sessions per day and each session will be of three hours duration.
4. Every candidate should perform one experiment each from Group I and Group II.
5. At least eighty percent practical should be completed by the student.
6. The marks distribution for practical is as below

Practical groups	**Marks**
Group I	20
Group II	20
Certified laboratory journal	10
Total Marks	**50**