MANGALORE UNIVERSITY
Suggested programme structure for the Under Graduate Programmes
Bachelor of Science (B. Sc.)

Semester	*Course 1	*Course 2	*Course 3	**Elective / Optional	Course	***Languages	****Compulsory	Total Credit	Total working hour
I	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)			3+3	2	23	4+4+4+4+4+4+4+4+2 = 34
II	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)			3+3	2	23	4+4+4+4+4+4+4+4+2 = 34
III	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)	2		3+3		23	4+4+4+4+4+4+4+2+4+4=34
IV	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)	2		3+3	2	25	4+4+4+4+4+4+4+2+4+4+2=36
V	8 [(2x3T) +2P]	8[(2x3T)+2P]	8 [(2x3T) +2P]				2	26	3+3+4+3+3+4+3+3+4+2=32
VI	8 [(2x3T) +2P]	8 [(2x3T) +2P]	8 [(2x3T) +2P]				2	26	3+3+4+3+3+4+3+3+4+2=32
								146	**202**

Note:
* Course 1 / * Course 2 / * Course 3: I to IV semesters Theory:3 credit = 4 contact hours &Practicals:2 credit = 4 contact hours
* Course 1 / * Course 2 / * Course 3: V to VI semesters Theory:3 credit = 3 contact hours &Practicals:2 credit = 4 contact hours
**Elective / Optional: 2 credit = 2 contact hours
***Languages: 3 credit = 4 contact hours
****Compulsory: 2 credit = 2 contact hours

MANGALORE UNIVERSITY
BSC SEP 2024
COURSE PATTERN AND SCHEME OF EXAMINATION
CORE SUBJECT: PHYSICS

Core/ Elective	Course Code	Title	Instruction / h /Week	Duration of the Exam(h)	Max. Marks			Credits
					IA	Exam	Total	
I Semester								
Core Subject		Mechanics & properties of matter	4	3	20	80	100	3
		Physics Practicals- I	4	3	10	40	50	2
Total Number of Credits for Core Subject (Physics) in I Semester: 5								
II Semester								
Core Subject		Acoustics, Relativity and Thermal Physics	4	3	20	80	100	3
		Physics Practical's-II	4	3	10	40	50	2
Total Number of Credits for Core Subject (Physics) in II Semester: 5								
III Semester								
Core Subject		Optics	4	3	20	80	100	3
		Physics Practicals -III	4	3	10	40	50	2
Discipline Elective optional		Astrophysics- Space mission	2	2	10	40	50	2
Total Number of Credits for Core subject (Physics) in III Semester: 5 Discipline elective: 02								
IV Semester								
Core Subject		Electricity	4	3	20	80	100	3
		Physics Practical's IV	4	3	10	40	50	2
Discipline Elective optional		Medical instrumentation / Energy sources	2	2	10	40	50	2
Compulsory Skill/ Practicals	BSCPHSS254	Optical/Electrical/ Electronic Instrumentation/ Any other field	2	Viva-voce	10	40	50	2
Total Number of Credits for Core subject (Physics) in III Semester: 5 Discipline elect. Opt.: 2 Compulsory skill / practical: 2								
V Semester								
Core Subject		Quantum Mechanics & Spectroscopy	3	3	20	80	100	3
		CMP & Semiconductor Physics	3	3	20	80	100	3
		Physics Practicals V	4	3	20	80	100	2
Total Number of Credits for Core Subject (Physics) in V Semester: 8								
VI Semester								
Core Subject		Nuclear Physics & Elementary Particles	3	3	20	80	100	3
		Electronics	3	3	20	80	100	3
		Physics Practicals VI	4	3	20	80	100	2
Total Number of Credits for Core Subject in VI Semester: 8								
Total number of Credits for Core Subject (Physics) from I - VI Semesters: 36 Discipline elective: 4 Compulsory skill / practical: 2								

Note: The theory IA will be based on the average of two internal tests or activities. The Practical IA will be based on regular performance and one model test.

Mangalore University
SEP 2024 BSC Physics syllabus structure

B Sc I Semester	**B Sc II Semester**
➢ Paper Title: Mechanics& properties of matter ➢ Paper Code: BSCPHST101 ➢ Unit distributions: Unit 1: review of vectors, Newtonian mechanics, gravitation Unit 2: Rotation dynamics, rigid body mechanics Unit 3: Properties of matter, elasticity Unit 4: Fluid Mechanics ➢ Practical title: Physics practical I ➢ Practical Code: BSCPHSP102	Paper Title: Acoustics, Relativity and Thermal Physics ➢ Paper Code: BSCPHST151 ➢ Unit distributions: Unit 1: Acoustics, Fourier theorem Unit 2: Relativity Unit 3: Thermal Physics Unit 4: Thermal radiation ➢ Practical title: Physics practical II ➢ Practical Code: BSCPHSP152
B Sc III Semester	**B Sc IV Semester**
➢ Paper Title: Optics ➢ Paper Code: BSCPHST201 ➢ Unit distributions: Unit 1: Review of theories of light, Interference Unit 2: Diffraction Unit 3: Polarization Unit 4: Electromagnetic theory ➢ Practical title: Physics practical III ➢ Practical code: BSCPHSP202	➢ Paper Title: Electricity ➢ Paper Code: BSCPHST251 ➢ Unit distributions: Unit 1: Network elements& theorems Unit 2: Alternating current circuits and filters Unit 3: Transients, electrical measurements & dielectrics Unit 4: Thermo electricity & power transmission ➢ Practical title: Physics practical IV ➢ Practical Code: BSCPHSP252
B Sc V Semester (2 papers)	**B Sc VI Semester**(2 papers)
➢ **Paper 1 title**: Quantum mechanics& Spectroscopy ➢ Paper code: BSCPHST301 ➢ Unit distributions: Unit 1: Development of Quantum mechanics Unit 2: Quantum Mechanics Unit 3: Atomic Models & Spectra Unit 4: Molecular Spectra, Scattering, LASER ➢ **Paper 2 title**: Condensed matter Physics & Semiconductor devices ➢ Paper code: BSCPHST302 ➢ Unit distributions: Unit 1: Statistical Physics, specific heat of solids &nano materials Unit 2: X – rays, Crystallography & Super conductivity Unit 3: Free electron theory of metals Unit 4: Semiconductor Physics ➢ Practical title: Physics practical V ➢ Practical Code: BSCPHSP303	➢ **Paper 1 title**: Nuclear Physics & elementary particles ➢ Paper code: BSCPHST351 ➢ Unit distributions: Unit 1: Nuclear properties, radioactivity Unit 2: Nuclear decay& spectra of nuclear radiation Unit 3: Nuclear force, nuclear reaction and nuclear reactors Unit 4: Particle accelerators & detectors, fundamental particles ➢ **Paper 2 title**: Electronics ➢ Paper code: BSCPHST352 ➢ Unit distributions: Unit 1: Semiconductor devices Unit 2: OPAMP Unit 3: Regulated Power Supply & Communication Electronics Unit 4: Digital Electronics ➢ Practical title: Physics practical VI ➢ Practical Code: BSCPHSP353

B Sc III Semester Discipline Elective optional	**B ScIV Semester Discipline Elective optional**
➢ Paper Title: Astrophysics- Space mission ➢ Paper Code: BSCPHSE203	Paper Title: Medical instrumentation / Energy sources ➢ PaperCode: BSCPHSE253

B Sc IV Semester compulsory skill/ practicals

- Paper Title: Optical /Electrical / Electronicinstrumentation/Any other field
- Paper Code: BSCPHSS253
- Objective: Departmental internship to enhance students' skills.

MANGALORE UNIVERSITY
SYLLABUS FOR BSc PHYSICS SEP 2024
Semester – I

Program Name	B Sc in Physics	Semester	I
Course Title	**Mechanics and Properties of matter**		
Course Code	BSCPHST101	**No. of Credits**	03
Contact Hours	52 (4 hours per week)	**Duration of SEA/ Exam**	03 h
Formative Assessment Marks	20	**Summative Assessment Marks**	80

Program Outcomes (PO):

PO-1: Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.

PO-2: Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.

PO-3: Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.

PO-4: Ethics: Apply the professional ethics and norms in respective discipline.

PO-5: Individual and teamwork: Work effectively as an individual as a team member in a multidisciplinary team.

PO-6: Communication: Communicate effectively with the stake holders, and give and receive clear instructions.

Course Learning Outcomes (CO)		**Program outcomes (POs)**					
At the end of the course students will be able to:		**PO- 1**	**PO- 2**	**PO- 3**	**PO-4**	**PO- 5**	**PO- 6**
i.	Estimate the possible error in measurement of a physical quantity, using its dimensional equation, the least counts of instruments used and by actual measurements in the appropriate system of units.	**X**	**X**	**X**		**X**	**X**
ii	Knowledge of newton's motion of bodies and gravitation and satellite motion	**X**	**X**	**X**			**X**
iii.	Apply laws of conservation of momentum and associated energy along with laws to motion to the systems of linear/rotational motion to determine different parameters associated with physically rigid bodies.	**X**	**X**	**X**			**x**
iv.	Capable of determining various elastic moduli of materials.	**X**	**X**	**X**		**X**	**X**
v.	Apply the concept of rotational dynamics and simple harmonic motion in various applications.	**X**	**X**	**X**	**X**		**X**
vi	Explain bending of beams and use of torsion pendulum in the determination of various physical parameters.	**X**	**X**	**X**			**X**
vii	Measure surface tension and factors affecting surface tension of liquids and hence measurement of viscosity liquids.	**X**	**X**		**X**		**X**

I Semester B Sc Physics Syllabus

Paper: Mechanics and Properties of matter	Duration

UNIT - I	**Mechanics:** Units and dimensions, Review of scalars and vectors. Derivative of a planar vector of constant magnitude but changing direction. Deduction of the results of uniform circular motion. Problems. (4h) Review of Newtonian mechanics: Newton's laws of motion, Concepts of inertia, force, momentum and energy. Gravitation (2 h) Conservation laws – linear and angular momentum and energy with examples, circular motion –central forces, centripetal and centrifugal forces with examples. Planetary motion- orbital motion, Kepler's laws (derivation). - Projectile motion with examples - escape velocity. Satellite motion, rockets, single and multistage rockets- rocket fuel, rocket shape,time period of the satellite, different types of satellites, shapes of the orbitsof satellites motion.Launching of satellites, re-entry problems.Problems. (7h)	13 h
UNIT – II	**Rigid body mechanics:** Moment of inertia and radius of gyration. Theorems of moment of inertia – parallel and perpendicular axes theorems with proof. Calculation of MI of regular and irregular shaped bodies - rectangular lamina, thin rod, circular disc (about different axes). Problems. (7 h) **SHM**: Review of simple pendulum, Vertical oscillations of the light loaded spring, expression for force constant. Problems. (2 h) **Theory of compound pendulum**: Expression for time period. Reversibility of centre of oscillation and centre of suspension. Bar pendulum, determination of g and K. Problems. (4 h)	13 h
UNIT - III	**Elasticity**: Definition for elasticity, stress and strain, elastic limit, Hooke's law, stress – strain diagram, Elastic constants q, k and n - definition (Mention of practical applications) Derivation of the relation connecting the elastic constants. Poisson's ratio – definition and derivation of limiting values (Mention of practical applications). Work done in stretching a wire, work done during twisting a wire, Derivation of expression for twisting couple on a cylinder.(7 h) **Bending of beams**: Explanation, explanation of uniform and non- uniform bending with examples, definition for bending moment, derivation of the expression for bending moment, cantilever bending explanation with examples, Expression for the depression produced at the loaded end of light cantilever.I-section Girders. (Mention of practical applications). Problems.(6 h)	13h
UNIT - IV	**Fluid dynamics:** Review of fluids and its properties with examples**.** Streamline flow, turbulent flow (examples) - critical velocity, Equation of continuity, Bernoulli's principle and its applications. (2 h) **Surface tension**: Attractive forces in a liquid –forces on the surface of a liquid- Definition of surface tension, molecular theory of surface tension - Surface energy, relation between surface tension and surface energy, illustrations of surface tension - pressure difference across curved surface- examples, excess pressure inside spherical liquid drop, discussion of angle of contact- special cases, Surface tension by drop weight method, factors affecting surface tension; Interfacial surface tension –determination interfacial tension by drop weight method.Problems. (6 h) **Viscosity:** Coefficient of viscosity – importance of viscosity with examples - determination of coefficient of viscosity by Poisulle's method (derivation) –terminal velocity- importance of terminal velocity -Stoke's law – Stoke's method for the determination of coefficient of viscosity (derivation), (Mention of practical applications). Problems. (5 h)	13h

Text Books:

1. Mechanics by, D. S. Mathur (S. Chand & Co.)
2. Mechanics and Relativity, 3rd Edition by Vidwan Singh Soni (PHI Learning Pvt. Ltd.)
3. Mechanics Berkeley Physics Course, Vol.1 by Charles Kittel, et.al. (Tata McGraw-Hill)
4. Physics for Degree Students by CL Aurora & PS Hemne (S. Chand & Co)
5. Mechanics by J C Upadhyaya (Himalaya Publishing House)
6. A Treatise on Heat by MeghnadSaha, and B. N. Srivastava, (Indian Press)
7. Heat, Thermodynamics and Statistical Physics by Brij Lal, Subrahmanyam and Hemne (S. Chand & Co.)

Reference Books:

1. Principles of Physics 9th Edition by Resnick, Halliday & Walker (Wiley)

2. Introduction to Special Theory of Relativity by Robert Resnick (Wiley Student Edition)
3. Physics for Scientists and Engineers by Jewett &Serway (Cengage learning India Pvt Ltd, Delhi)
4. The Feynman Lectures on Physics – Vol 1 by Richard P Feynman, Robert B Leighton, Mathew Sands, (Narosa Publishing House)
5. Concepts of Modern Physics by Arthur Beiser (Tata McGraw Hill)
6. Modern Physics by Kenneth Krane (Wiley)
7. Newtonian Mechanics by AP French (Viva Books)
8. Modern Physics by G Aruldhas& P Rajagopal (PHI Learning Pvt. Ltd)

List of experiments to be performed in the laboratory:

A minimum of 8 experimentsneed to be carried out in the laboratory. (4 h per week)

1	Verification of parallel and perpendicular axis theorems.
2	Determination of MI and mass of Fly Wheel.
3	Law of conservation of linear momentum by collision in two dimensions.
4	Determination of g and K using bar pendulum (two-hole method and h - T graph).
5	Determination of g by spiral spring.
6	Uniform bending – measurement of q
7	Torsion Pendulum –moment of inertia of irregular body.
8	Acceleration due to gravity, from the $L - T^2$ graph, for a simple pendulum.
9	Effect of mass of the bob on the time period of the simple pendulum.
10	Effect of amplitude of oscillation on the time period of the simple pendulum.
11	Inclined plane – Dependence of downward force on angle of inclination.
12	Cantilever bending – Determination of q.
13	Surface tension by drop weight method.
14	Rigidity modulus using torsion pendulum.
15	Determination of q by Koenig's Method.
16	Interfacial tension between water and kerosine.
17	Searle's double bar – determination of q, n and σ.
18	Rigidity modulus by static Torsion.
19	Viscosity by Stoke's method.
20	Viscosity by Poiseuille's method
21	Viscosity by Oswald Viscometer
22	Determination of q by stretching of wire.

Reference Books for Laboratory Experiments:

1. Advanced Practical Physics for students by B.L. Flint and H.T. Worsnop (Asia Publishing House.)
2. A Text Book of Practical Physics by I. Prakash & Ramakrishna, 11th Edition (Kitab Mahal)
3. Advanced level Physics Practicals by Michael Nelson and Jon M. Ogborn 4th Edition (Heinemann Educational Publishers)
4. A Laboratory Manual of Physics for undergraduate classes by D. P. Khandelwal (Vani Publications).
5. BSc Practical Physics Revised Ed by CL Arora (S. Chand & Co)
6. An advanced course in practical physics by D. Chattopadhyay, PC Rakshit, B. Saha (New Central Book Agency Pvt Ltd)

Suggested Activities		
Mechanics I		
Activity 1	Takedifferentobjectsofregularshape,writethedimensionalequationfor their volume, surfacearea andwritetheirunitsinSIand CGSsystems.Forthe Abovecalculatetheactualvolumeandsurfaceareausingrelevant measuring tools.	
Activity 2	Drop balls of different hardness on different surfaces and list them in order of their energy absorption and give reasons.	
Activity 3	Students can try and understand conservation of energy in every day with examples.	

	For example: i) What happens in solar conservation panels ii) Pushing an object on the table it moves iii) Moving car hits a parked car causes parked car to move. In these cases, energy is conserved. How? Understand and verify them. Students can try and understand conservation of momentum with help of coins and balls by referring to websites.	
Activity 4	Prepare and present a report on different types of Geo Satellite orbits and their characteristics	
Mechanics-II		
Activity 1	Devisean experiment that demonstrates that the variation in the distribution of mass in a rotating body affects the rotating speed. Plot a graph of the variation in the position of mass with the centre of the body and the average speed of rotation.	
Activity 2	Moment of inertia is an abstract concept. It simply gives a measure of rotational inertia of a rigid body and it is proportional to the product of the square of radius, r of the body and its mass, m. Students by Referring to websites, students can construct and perform simple experiments to verify that MI α mr^2. Students can try to understand law of inertial with the help of coins and balloons by referring to websites. Reference: www.khanacademy.org, www.pinterest.com, www.serc.cerleton.edn, https://www.youtube.com	
Activity 3	Prepare suitable charts and give seminar talks related to moment of inertia, gravitation and planetary motion.	
Activity 4	Rolling of different disc and cylinders on inclined plane to understand the moment of inertia. (ii) Listing and discussing the moment of inertia of bodies come across in daily life.	
Surface tension and viscosity		
Activity 1	Measure surface tension of water and other common liquids and compare and learn i) Why water has high ST? think of reasons. ii) Check whether ST is a function of temperature? You can do it by heating the water to different temperatures and measure ST. iii) Plot ST versus T and learn how it behaves. Mix some quantity of kerosene or any oil to water and measure ST. Check whether ST for the mixture is more or less than pure water. List the reasons.	
Activity 2	Collect a set of different liquids and measure their viscosity. i) Find out whether sticky or non-sticky liquids are most viscous. List the reasons. ii) Mix non sticky liquid to the sticky liquid in defined quantities and measure viscosity. Find out viscosity is increasing or decreasing with increase of non-sticky liquid concentration. iii) Do the above experiment by mixing sticky liquid to the non-sticky liquid. Find out change in viscosity with increase of concentration of sticky liquid. List the applications where concept of Viscosity plays a dominant role.	
Elasticity		
Activity 1	Arrange a steel spring with its top fixed with a rigid support on a wall and a meter scale alongside. Add 100 g load at a time on the bottom of the hanger in steps. This means that while putting each 100g load, we are increasing the stretching force by 1N. Measure the extension for loads up to 500g. Plot a graph of extension versus load. Shape of the graph should be a straight line indicating that the ratio of load to extension is constant. Go for higher loads and find out elastic limit of the material.	
Activity 2	Repeat the above experiment with rubber and other materials and find out what happens after exceeding elastic limit. Plot and interpret	
Activity 3	Classify different materials into elastic and plastic materials. Study the bending magnitudes of different shape and material rods.	

SYLLABUS FOR BSc PHYSICS SEP 2024
Semester – II

Program Name	*B Sc in Physics*	*Semester*	*II*
Course Title	**Acoustics , Relativity and Thermal Physics**		
Course Code	*BSCPHYC151*	***No. of Credits***	*03*
Contact Hours	*52* (4 h per week)	***Duration of SEA/ Exam***	*03 hours*
Formative Assessment Marks	*20*	***Summative Assessment Marks***	*80*

Program Outcomes (POs)

PO-1: Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.

PO-2: Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.

PO-3: Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.

PO-4: Ethics: Apply the professional ethics and norms in respective discipline.

PO-5: Individual and teamwork: Work effectively as an individual as a team member in a multidisciplinary team.

PO-6: Communication: Communicate effectively with the stake holders, and give and receive clear instructions.

Course Learning Outcomes (CO)	**Program Outcomes (POs)**					
At the end of the course students will be able to:	**PO- 1**	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**
CO-1:Apply the concept of the relative motion of frame of reference with appropriate postulates of the theory of relative motion to the measurement of length, time, mass, energy and velocity.	**X**	**X**	**X**			**X**
CO-2:Apply the laws of thermodynamics and concept of heat engine to various observations.	**X**	**X**	**X**	**X**	**X**	**X**
CO-3: Explain fundamental laws of black body spectrum.	**X**	**X**	**X**	**X**	**X**	**X**
CO-4: Explain free, damped and forced oscillations, progressive waves & Fourier analysis of square wave.	**X**	**X**			**X**	**X**

Semester – II

Paper: Acoustics, Relativity and Thermal Physics		Duration
UNIT - I	**Waves & Oscillations** **Oscillations**: Review of harmonic oscillations (examples) Equation for a harmonic oscillator. Free oscillations and damped oscillations (practical examples and usages). Setting up of equation for forced oscillations and its solution, condition for resonance. Problems. (4 h) **Waves**: Review of waves -Different types of waves(examples), Equation for a progressive wave in one dimension. Differential equation of wave motion, characterization of simple harmonic waves (frequency, wavelength, amplitude, phase, etc. both in graphical and mathematical), applications of waves. Propagation of waves: a) Longitudinal waves:i) Through fluid - Expression for velocity of longitudinal waves (derivation) – examples - Newton`s formula for velocity of sound in air and Laplace correction. ii) Through solid -Vibrations in a rod. b) Transverse waves:transverse waves (examples) Velocity of transverse vibrations in a	13 h

	string (derivation). Expression for fundamental frequency and overtones (examples). Problems. (6 h) **Fourier's theorem**: Statement and explanation– expression for Fourier coefficients (exponential form). Limitations of Fourier theorem. Mathematical analysis of a square wave(examples). Problems. (3 h)	
UNIT - II	**Relativity:** **Frame of reference:**Inertial and non - inertial frames (examples**).** Galilean principle of relativity,Galilean transformation equation. space and time invariance,velocity addition theorem in inertial frames. Concept of fictitious forces with examples. Problems.(4 h) **Concept of absolute frame of reference**:Ether hypothesis. Velocity of light and failure of Galilean concepts.(2 h) **Special theory of relativity**: Postulates of special theory of relativity. Lorentz transformation (no derivation). Length contraction. Relativity of simultaneity. Time dilation- Twin paradox, Relativistic mass (mention), velocity addition theorem. Einstein's mass energy equivalence- (derivation based on photon gun experiment). Relativistic expression for kinetic energy. Relation between energy and momentum. Rest mass of the photon. Problems. (7 h)	13 h
UNIT - III	**Thermal Physics:** Review of gas laws (equation), energy temperature relation.Types of thermal processes. Isothermal, adiabatic, reversible and irreversible (examples). Expression for work done during isothermal and adiabatic processes(examples). Problems. (3h) I law of thermodynamics. Carnot's engine: Carnot's cycle. Efficiency of Carnot's engine. Reversibility of Carnot's engine(mention of practical engines). Refrigerator (principle only), Coefficient of performance. Derivation of Clausius - Clapeyron first latent heat equation and applications. II law of thermodynamics: Kelvin's and Clausius Statements(mention of practicalexamples). Problems. (7 h) **Entropy**: Change in entropy during isothermal, adiabatic, reversible and irreversible processes(examples). T-S diagram of Carnot's cycle. Problems. (3 h)	13 h
UNIT - IV	**Low temperature Physics**: Ideal and real gases, liquefaction of gases(examples).Results of Andrews experiment. Joule - Thomson Effect, J - Tporous plug experiment: Boyle temperature, inversion temperature and critical temperature - relation. Adiabatic demagnetization. Cryogenics. Measurements of low temperature. Problems. (5h) **Radiation**: Concept of black body, Blackbody radiation, energy distribution in a black body radiation. Wien's displacement law, Stefan-Boltzmann law, Wien's distribution law and Rayleigh-Jeans law. Planks hypothesis of radiation, Planks explanation of black body radiation. Derivation of Planck's law of black body radiation. Deduction of Wien's distribution law,Rayleigh-Jeans lawfromPlanck's law. Problems. (8 h)	13 h

References books:

1. Fundamentals of Physics by Halliday Resnik and Walker,Wiley publications
2. Mechanics by D S Mathur S Chand publication
3. Properties of matter By Brijlal and Subramanyam, S Chand publication
4. Physics for degree students By C L Arora and P S Hemne, S Chand publication
5. College physics by N Sundarrajan:United publisher
6. Mechanics by J C Upadhyaya Himalaya publishing house Pvt Ltd.
7. Modern Physics by R Murugeshan and KiruthigaSivaprasath. S Chand publication.

List of Experiments to be performed in the Laboratory:
A minimum of 8 experiments need to be carried out in the laboratory. (4 hours per week)

1	Velocity of sound using sonometer.
2	Frequency of ac using sonometer.
3	Study of Lissajous figures.
4	Frequency of AC by Melde's experiment
5	Specific heat of liquid by cooling.
6	Specific heat of liquid by electrical method.
7	Specific heat of a solid.
8	Platinum resistance thermometer.
9	Thermocouple – Determination thermo-emf.
10	Helmholtz's Resonator.
11	Fourier analysis of square wave.
12	Damped oscillations – Measurement of Q factor
13	Stefan - Boltzmann law.
14	Planck's constant using LED

Relativity	
Activity 1	Study the applications of Einstein's mass energy equivalence and prepare a brief report.
Activity 2	Watch animated videos available in YouTube related to length contraction, time dilation, twin paradox etc.

Thermal Physics		
Activity 1	I feel cold because coldness enters my body. Discuss the statement in day-to-daylife.Approximately give examplesof **(i)** Opensystem **(ii)** Closedsystemand **(iii)** Isolatedsystem Discuss when the temperature of a body is locked until what time you holdthe thermometer in contact with a body. Discuss it in contact with laws ofthermodynamics. Discuss why when a person works or does exercise, he sweats. Reason it with the laws ofthermodynamics.	
Activity 2	Take four different sizes of same metal, preferable of same shape and give one piece to each group. Heat it uniformly on a hot plate. Keep a beaker of water with a thermometer immersed in it. Drop one hot metal into the water and record the temperature with time. Repeat the experiment for the other heated metal pieces of different sizes. (i) Plot a graph for the volume of the metal piece used v/s respective temperature change observed. (ii) Determine the heat capacity and specific heat of the metal used.	
Activity 3	Take ice cubes of different size and immerse in water and measure the temperature change with time and repeat the experiment. Graph the observations.	

Thermal Radiation		
Activity 1	Illuminate photo diode (as source of light) at four different applied DC voltages through spectrometer and receive the light at photo detector /photo conductor /LDR fixed in the place of eye piece of telescope and measure the current at various angles of incidence. Record the temperature of photo diode at each applied dc voltage. Plot diode current vrs Spectrometer reading. Study the family of curves obtained.	

Distribution of marks SEP- 2024 for all the Semesters

I, II, III, IV, V and VI of B Sc (Physics theory exams) - Mangalore University

Internal Assessment : 20 (max. marks per paper). Average of two tests

Semester Examination: 80 (max. marks per paper)

Total : 100 (max. Marks per paper)

Question paper pattern

Reg No. | | | | | | | | | | | | |

---------- (Paper Code)

--------- Semester B.Sc. Examination, ----------(Month) 2024

(SEP - 2024) (2024-2025 Batch Onwards)

PHYSICS (DSC)

(Title) ----------

Time: 03 Hours Max. Marks: 80

Instructions: i) Answer questions from **all** Parts.

ii) Scientific calculators are **allowed**.

Part A

I. Answer any **Eight** (answer 8(two question from each unit) out of 10)questions **1×8 = 8**

II. Answer any **Six** (answer 6 out of 8 (two question from each unit)) questions **2×6 = 12**

Part B

Answer One full question (1 out of 2) from each unit (I, II, III & IV)

Questions carrying 4 marks 1 × 4 = 4

Questions carrying 7 marks 1 × 7 = 7

(Total of each unit 4+7 =11

(Total of four units **4× 11= 44**

Part C

Problems. Answer any four (4 out of 6 at least 1 problem from each unit) **4 × 4 = 16**

Total of Part A, part B and Part C (8+12+44 +16 = 80) **= 80**

Guidelines for subject with practical's regarding student-teachers ratio for conducting practicals in SEP-2024

1. Practical batches should be formed in units 10 students in a batch for 1 teacher.
2. Under no circumstances there will be more than 20 students in a batch and more than 2 teachers in a batch.
3. If, for some reason practical batches cannot be formed strictly as per above pattern,the following student -teachers ratio pattern shall be strictly followed.

For degree classes in SEP-2024 - student-teachers ratio

Si.No.	Student strength in class of practical's	Number of teachers to be assigned
1	Up to 15	1
2	From 16 to 27	2
3	From 28 to 35	3

Distribution of marks in Practical exams:

Allotmentof marks	**I, II, III & IV Semester**	**V & VI Semester**
Formula	3	5
Circuit&diagram	3	5
Setting of the experiment	4	10
Observation& trails	10	20
Calculation&graph	3	15
Result&accuracy	3	5
Viva – Knowledgeoftheexperiment	4	10
Practical Record	10	10
Total of the above	**40**	**80**
Internalexamination& continuous evaluation	10	20
Total Marks	**40+ 10 = 50**	**80 + 20 = 100**