K.S.N GOVT. DEGREE COLLEGE FOR WOMEN

An ISO Certified & Autonomous Institution

Affiliated to Sri Krishnadevaraya University - Anantapuramu - A.P - 515002

NAAC A Grade (3.15/4.00) 3rd Cycle

DEPARTMENT OF PHYSICS

BOARD OF STUDIES MEETING

(As per the new regulations of APSCHE w.e.f. 2023-2024)

Date: 10 - 10 - 2023

Semester : I

Multidisciplinary course for B.A/B.Com/BBA/BCA
Principles of Physical Sciences

B.Sc Physics : Semester - II

Course:1 Mechanics and Properties of Matter
Course:2 Waves and Oscillations

Resolutions

Syllabus – 2023 -2024

Question Paper Pattern

Panel of Question Paper Setters

K.S.N GOVT. DEGREE COLLEGE FOR WOMEN

(An ISO 9001:2015, 14001:2015, 50001:2011 CERTIFIED COLLEGE)
(Re-accredited by NAAC with "A" Grade)
Behind RTO Office, Bhairava Nagar, Ananthapuramu-515002
(Affiliated to SK University, Ananthapuramu)
An Autonomous Institution

NAAC A (3.15/4.00) Grade

Dr. P. Sankaraiah M. Sc, Ph.D.,
Principal
&
Former Executive Council Member
Sri Krishnadevaraya University, Anantapuramu

Office : 08554 - 297016
Mobile : 9849626797

ESTD : 1984

To
Dr. L. Shiva Sankar Reddy
Professor of Physics
SK University
Ananthapuramu

7-10-2023

Respected Sir/Madam

Sub: KSN Government Degree College (A) – Ananthapuramu - Proposed nomination of -- Dr. L. Shiva Sankar Reddy, SK University, Ananthapuramu Acceptance for Invitation to act as External Subject Expert for Board of Studies – Requested - Regarding

I am pleased to convey that you are nominated by the Registrar of Sri Krishnadevaraya University Academic Council as External Subject Expert in the Board of Studies of Physics Subject. The first BoS Meeting for the Academic Year 2023-24 shall be held on 10th of October, 2023 in the concerned department at 11 AM for the Proposed Single Majors, Minors, Multidisciplinary, Skill Enhancement Courses and General Courses. You are requested to give your consent for the same and are cordially invited to attend the BoS Meeting.

Yours Faithfully

7.10.23

(Dr. P. Sankaraiah)
Principal

jkc.anantapurwomen@gmail.com
www.ksngdcw.ac.in
Behind R.T.O office, Bhairava Nagar, Ananthapuramu – 515002, Andhra Pradesh

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Office : 08554 - 297016
Mobile : 9849626797

ESTD : 1984

To
The Registrar
Cluster University ,
Kurnool

7-10-2023

Respected Sir/Madam

Sub: KSN Government Degree College (A) – Ananthapuramu - Proposed nomination of – Dr. M.D.Waaiz , Lecturer in Physics, Silver Jubliee Government Degree College , Kurnool Acceptance for Invitation to act as External Subject Expert for Board of Studies – Requested – Regarding

I am pleased to convey that **Dr.Sri. M.D.Waaiz** is proposed in Academic Council as External Subject Expert in the Board of Studies of Physics Subject. I request you to kindly permit the concerned faculty to accept our invitation and give his/her consent for the Same. The first BoS Meeting for the Academic Year 2023-24 shall be held on 10th of October, 2023 in the concerned department at 11 AM for the Proposed Single Majors, Minors, Multidisciplinary, Skill Enhancement Courses and General Courses. Dr. Sri. M.D.Waaiz is requested to give his/her consent for the same and is cordially invited to attend the BoS Meeting.

Copy to the Principal, Silver Jubliee Government Degree College, Kurnool
Copy to the Individual

Yours Faithfully

(Dr. P. Sankaraiah) 7.10.23
Principal

ikc.anantapurwomen@gmail.com
www.ksngdcw.ac.in
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&
Former Executive Council Member
Sri Krishnadevaraya University, Anantapuramu

Office ☎ : 08554 - 297016
Mobile : 9849626797

ESTD : 1984

To
The Registrar
Cluster University
Kurnool

7-10-2023

Respected Sir/Madam

Sub: KSN Government Degree College (A) – Ananthapuramu - Proposed nomination of – Sri K. Lakshmana Gupta , Lecturer in Physics, Govt. Degree College for (Men) Kurnool Acceptance for Invitation to act as External Subject Expert for Board of Studies – Requested - Regarding

I am pleased to convey that Sri K.Lakshmana Gupta is proposed in Academic Council as External Subject Expert in the Board of Studies of Physics Subject. I request you to kindly permit the concerned faculty to accept our invitation and give his/her consent for the same. The first BoS Meeting for the Academic Year 2023-24 shall be held on 10th of October, 2023 in the concerned department at 11 AM for the Proposed Single Majors, Minors, Multidisciplinary, Skill Enhancement Courses and General Courses. Sri K. Lakshmana Gupta is requested to give his/her consent for the same and is cordially invited to attend the BoS Meeting.

Copy to the Principal Govt. Degree College for (Men)
Copy to the Individual

Yours Faithfully

(Dr. P. Sankaraiah) 7.10.23
Principal

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www.ksngdcw.ac.in
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Principal
&
Former Executive Council Member
Sri Krishnadevaraya University, Anantapuramu

Office ☎ : 08554 - 297016
Mobile : 9849626797

ESTD : 1984

To
Sri C. Lakshmi Narayana
Mythri Roto Plast
Ananthapuramu

7-10-2023

Respected Sir/Madam

Sub: KSN Government Degree College (A) – Ananthapuramu - Proposed nomination of – Sri C. Lakshmi Narayana , Acceptance for Invitation to act as Member for Board of Studies – Requested - Regarding

I am pleased to convey that you are nominated as Member for the Board of Studies of Physics Subject. The first BoS Meeting for the Academic Year 2023-24 shall be held on 10th of October, 2023 in the concerned department at 11 AM for the Proposed Single Majors, Minors, Multidisciplinary,Skill Enhancement Courses and General Courses. You are requested to give your consent for the same and are cordially invited to attend the BoS Meeting.

Yours Faithfully

7.10.23

(Dr. P. Sankaraiah)
Principal

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Principal
&
Former Executive Council Member
Sri Krishnadevaraya University, Anantapuramu

Office : 08554 - 297016
Mobile : 9849626797

ESTD : 1984

To
Ms. K. Sravani, M.Sc
Venal Soft Solutions Pvt.Ltd
Hyderabad

7-10-2023

Respected Sir/Madam

Sub: KSN Government Degree College (A) – Ananthapuramu - Proposed nomination of – Ms. K. Sravani ,Acceptance for Invitation to act as Member for Board of Studies – Requested - Regarding

I am pleased to convey that you are nominated as Member for the Board of Studies of Physics Subject. The first BoS Meeting for the Academic Year 2023-24 shall be held on 10th of October, 2023 in the concerned department at 11 AM for the Proposed Single Majors, Minors, Multidisciplinary, Skill Enhancement Courses and General Courses. You are requested to give your consent for the same and are cordially invited to attend the BoS Meeting.

Yours Faithfully

(Dr. P. Sankaraiah) 7.10.23
Principal

jkc.anantapurwomen@gmail.com
www.ksngdcw.ac.in
Behind R.T.O office, Bhairava Nagar, Ananthapuramu – 515002, Andhra Pradesh

K.S.N GOVT. DEGREE COLLEGE FOR WOMEN

An ISO Certified & Autonomous Institution

Affiliated to Sri Krishnadevaraya University - Ananthapuramu - A.P - 515002

COURSE STRUCTURE OF PHYSICS AS MAJOR and MULTIDISCIPLINARY

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Essentials and Applications of Mathematical Physical and Chemical Sciences	5	4
		2	Advances in Mathematical Physical and Chemical Sciences	5	4
		3	Multidisciplinary course for B.A/B.Com/BBA/BCA Principles of Physical Sciences	2	1
	II	3	Mechanics and Properties of Matter	3	3
			Mechanics and Properties of Matter Practical Course	2	1
		4	Waves and Oscillations	3	3
			Waves and Oscillations Practical Course	2	1

AGENDA:

- To review the curriculum as prescribed by APSCHE with effect from Academic Year 2023-24
- To discuss whether changes are required in the curriculum
- To discuss and propose the criteria and pattern of internal assessment
- To discuss and propose the pattern of external assessment
- To offer value added Add On and Certificate Courses
- Any other subject with the permission of the Chairperson

Constitution of the Board of Studies in Physics

S.No	Name	Designation in BoS	Signature
1.	Sri S Lakshmi Rangaiah Lecturer in Physics, HOD	Chairperson	
2.	Sri V Thimma Reddy Lecturer in Physics	Member	
3.	Dr. L. Shiva Sankar Reddy Prof. of Physics, S K University, Anantapur	Subject Expert (Nominated by Vice Chancellor)	
4.	Dr. M D Waaiz Lecturer in Physics Silver Jubilee Govt. College, Kurnool	Subject Expert (Nominated by the Academic Council)	
5.	Sri K Lakshmana Gupta Lecturer in Physics GDC for men Kurnool	Subject Expert (Nominated by the Academic Council)	
6.	Sri C. Lakshmi Narayana Mythri Roto plast Ballary Road, Anantapur	Industry Representative	
7.	Ms. K Sravani M.Sc Venal Soft Solutions Pvt. Ltd. Hyderabad	Member College Alumnae	

Constitution of the Board of Studies in Physics

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3.	Dr. L. Shiva Sankar Reddy Prof. of Physics, S K University, Anantapur	Subject Expert (Nominated by Vice Chancellor)	
4.	Dr. M D Waaiz Lecturer in Physics Silver Jubilee Govt. College, Kurnool	Subject Expert (Nominated by the Academic Council)	
5.	Sri K Lakshmana Gupta Lecturer in Physics GDC for men Kurnool	Subject Expert (Nominated by the Academic Council)	
6.	Sri C. Lakshmi Narayana Mythri Roto plast Ballary Road, Anantapur	Industry Representative	
7.	Ms. K Sravani M.Sc Venal Soft Solutions Pvt. Ltd Hyderabad	Member College Alumnae	

ANNEXURE –I

Recommended Question Paper Patterns and Models

K.S.N Government Degree College for Women (A)

QUESTION PAPER PATTERN FOR SEM I and II (Major)

Time: 3 Hrs Max.Marks:60

PART-A

Answer any Five questions. Each question carries 4marks. 5X4 = 20M.

1. From UNIT-I
2. From UNIT-II
3. From UNIT-III
4. From UNIT-IV
5. From UNIT-V
6. From UNIT-I to V
7. From UNIT-I to V
8. From UNIT-I to V

(Two questions from each Unit I ,II, III and one from each unit IV & V)

PART-B

Answer ALL questions. Each question carries 8 Marks. 5X8 = 40M

9. (a)

(Or)

(b)

10. (a)

(Or)

(b)

11. (a)

(or)

(b)

12. (a)

(or)

(b)

13. (a)

(or)

(b)

(Set ONE question from each Unit-I, II, III, IV, V with internal choice)

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2.	Sri V Thimma Reddy Lecturer in Physics	Member	
3.	Dr. L. Shiva Sankar Reddy Prof. of Physics, S K University, Anantapur	Subject Expert (Nominated by Vice Chancellor)	
4.	Dr. M D Waaiz Lecturer in Physics Silver Jubilee Govt. College, Kurnool	Subject Expert (Nominated by the Academic Council)	
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ANNEXURE - II

INTERNAL ASSESSMENT EXAM PATTERN (CIA)

1. There will be two internal assessment examinations of 20 and 15 marks each.
2. The Internal assessment in order to ensure the description of the abilities and other qualities a course seeks to develop will be tested in form of CIA.

S.No	Type of Assessment	Weightage Assigned
1	Assignments	5
2	Project-Work/Seminar/Group Discussion,/Role play /Quizzes/Presentations	5
3	Cleaning, Greening and Attendance	5
4	Testing ol knowledge though Mid-term examinations (Mid -1 + Mid -2)	20+15
	Total	50

The marks Obtained by a Student for 50 Marks total of (Two Mid Exams for 35, Assignments 5, Class Room Activates 5, Clean & Green and Attendence5) shall be Scale down to 40 Marks

INTERNAL EXAMINATION – I
QUESTION PAPER FORMAT

The question paper consists of THREE sections. Total marks 20

Section-A

Long answer questions

Answer any one of the following questions. 1×5=5M

1.
2.
3.

Section-B

Short answer questions

Answer any five of the following questions. 2 × 5 = 10M

1.
2.
3.
4.
5.
6.
7.
8.

Section-C

Answer the following objective questions. $10 \times \frac{1}{2} = 5$ M

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

MIDTERM EXAMINATION – II
QUESTION PAPER FORMAT

The question paper consists of TWO sections. Total marks 15

Section-A

Long answer questions

Answer any one of the following questions. 1×5=5M

1.

2.

3.

Section-B

Short answer questions

Answer any five of the following questions. 2 × 5 = 10M

1.

2.

3.

4.

5.

6.

7.

8.

Scheme of Valuation for

Practical Examinations

Time:3hrs **Max.Marks:50**

1.	Formulae&Explanation	-6 Marks
2.	Tabularform+graph+circuit diagram	-6 Marks
3.	Observations	-12 Marks
4.	Calculation,graph,precautionandresults	-06 Marks
5.	Vivavoice	-10 Marks
6.	Records	-10 Marks

Note: Minimum of 6 experiments to be recorded.

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5.	Sri K Lakshmana Gupta Lecturer in Physics GDC for men Kurnool	Subject Expert (Nominated by the Academic Council)	
6.	Sri C. Lakshmi Narayana Mythri Roto plast Ballary Road, Anantapur	Industry Representative	
7.	Ms. K Sravani M.Sc Venal Soft Solutions Pvt. Ltd Hyderabad	Member College Alumnae	

ANNEXURE

PANEL OF QUESTION PAPER SETTERS

Dr.M D Waaiz Lecturer in Physics Silver Jubilee College, Kurnool - 9849793821	A Narasimhulu Lecturer in Physics GDC Udayagiri 9490897509	K Lakshmana Gupta Lecturer in Physics GDC for Men Kurnool - 9440673899
Smt. T Parveen Lecturer in Physics GDC Nandikotkur, 9985421907	Smt. Padmavathi Lecturer in Physics KVR GDC (W) Kurnool - 7013437366	S Devendra Lecturer in Physics Arts college Ananthapuram 9966987614
G Chenna Reddy Lecturer in Physics GDC, Penukonda 9441765354	N Lalitha Kumari Lecturer in Physics GDC, Dhone 9490882626	S Pavani Lecturer in Physics GDC Dharmavaram, 9133437806
S Hari Prasad Lecturer in Physics Adoni Arts & Science College, Adoni. 9032208357	Sri J V V Kesava Rao Principal GDC Penukonda 9440165007	Dr.G Mahaboob Basha Lecturer in Physics KVR GDC (W) Kurnool- 8333054072
B Madhusudan Lecturer in Physics Arts college Ananthapuram 9515962917	Dr. K Chandra Sekhar Reddy Lecturer in Physics GDC Kalyanadurgam, 9440247699	Sri Hemanth Lecturer in Physics GDC for Men, Kurnool - 9885997283

SEMESTER-I

COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL ANDCHEMICAL SCIENCES

Theory Credits: 4 5 hrs/week

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS:

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus-Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of anglesVectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems **Statistical Measures**: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS:

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: :

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.

Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.

2. Elementary Trigonometry by H.S.Hall and S.R.Knight

3.Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.

4.Basic Statistics by B.L.Agarwal, New age international Publishers

5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman

6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker

7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.

8. Physics for Technology and Engineering" by John Bird

9. Chemistry in daily life by Kirpal Singh

10. Chemistry of bio molecules by S. P. Bhutan

11. Fundamentals of Computers by V. Raja Raman

12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

SEMESTER-I

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICALAND CHEMICAL SCIENCES

Theory | Credits: 4 | 5 hrs/week

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

3. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms – Reduction of general equation into various forms – Point ofintersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product ruleand quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose ofa matrix and determinants

UNIT II: ADVANCES IN PHYSICS:

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. **Recent advances in the field of nanotechnology**: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY:

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical Modelling applications in physics and chemistry

Application of Renewable energy: Grid Integration and Smart Grids,

Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah

SEMESTER-II

COURSE 3: MECHANICS AND PROPERTIES OF MATTER

Theory Credits: 3 3 hrs/week

COURSE OBJECTIVE:

The course on Mechanics and Properties of Matter aims to provide students with a fundamental understanding of the behaviour of physical systems, both in terms of mechanical motion and in terms of the properties of matter

LEARNING OUTCOMES:

1. Students will be able to understand and apply the concepts of scalar and vector fields, calculate the gradient of a scalar field, determine the divergence and curl of a vector field.
2. Students will be able to apply the laws of motion, solve equations of motion for variable mass systems
3. Students will be able to define a rigid body and comprehend rotational kinematic relations, derive equations of motion for rotating bodies, analyze the precession of a top and gyroscope, understand the precession of the equinoxes
4. Students will be able to define central forces and provide examples, understand the characteristics and conservative nature of central forces, derive equations of motion under central forces.
5. Students will be able to differentiate between Galilean relativity and the concept of absolute frames, comprehend the postulates of the special theory of relativity, apply Lorentz transformations, understand and solve problems

UNIT-I VECTOR ANALYSIS

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II MECHANICS OF PARTICLES

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

UNIT-III MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.

UNIT-IV CENTRAL FORCES

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler's laws. Motion of satellites

UNIT-V SPECIAL THEORY OF RELATIVITY

Galilean relativity, Absolute frames. Michelson-Morley experiment, The negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

REFERENCE BOOKS:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, Sulthan Chand & Co, New Delhi
3. Mechanics - J.C. Upadhyaya, Ramprasad & Co., Agra
4. Properties of Matter - D.S. Mathur, S.Chand & Co, New Delhi ,11th Edn., 2000
5. Physics Vol. I - Resnick-Halliday-Krane ,Wiley, 2001
6. Properties of Matter – Brijlal & Subrmanyam, S. Chand &Co. 1982
7. Dynamics of Particles and Rigid bodies– Anil Rao, Cambridge Univ Press, 2006
8. Mechanics-EM Purcell, Mc Graw Hill
9. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
10. College Physics-I. T. Bhima sankaram and G. Prasad. Himalaya Publishing House.
11. Mechanics, S. G. Venkata chalapathy, Margham Publication, 2003.

SEMESTER-II
COURSE 3: MECHANICS AND PROPERTIES OF MATTER

Practical | Credits: 1 | 2hrs/week

COURSE OBJECTIVE:

To develop practical skills in the use of laboratory equipment and experimental techniques for measuring properties of matter and analyzing mechanical systems.

LEARNING OUTCOMES:

1. Mastery of experimental techniques: Students should become proficient in using laboratory equipment and experimental techniques to measure properties of matter and analyze mechanical systems.
2. Application of theory to practice: Students should be able to apply theoretical concepts learned in lectures to real-world situations, and understand the limitations of theoretical models.
3. Accurate recording and analysis of data: Students should be able to accurately record and analyze experimental data, including understanding the significance of error analysis and statistical methods.
4. Critical thinking and problem solving: Students should be able to identify sources of error, troubleshoot experimental problems, and develop critical thinking skills in experimental design and analysis.
5. Understanding of physical principles: Students should develop an understanding of the physical principles governing mechanical systems and the properties of matter, including elasticity, viscosity, and thermal expansion.

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle's viscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

SEMESTER-II
COURSE 4: WAVES AND OSCILLATIONS

Theory Credits: 3 3hrs/week

COURSE OBJECTIVE:

This course provides students with a broad understanding of the physical principles of the oscillations, to help them develop critical thinking and quantitative reasoning skills, to empower them to think creatively and critically about scientific problems and experiments.

LEARNING OUTCOMES:

The student should be able

1. To describe the basic characteristics of waves such as frequency, wavelength, amplitude, period, and speed.
2. To utilize mathematical relationships related to wave characteristics.
3. To compare particle motion and wave motion in different types of waves.
4. To distinguish between Longitudinal and Transverse waves.
5. To get the knowledge about how to construct and analysis the square waves, saw tooth waves, etc. from Fourier analysis

UNIT-I Simple Harmonic oscillations

Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum- measurement of 'g', Principle of superposition, beats, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures.

UNIT-II Damped and forced oscillations

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.

UNIT-III Complex vibrations 9hr

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients.

UNIT-IV Vibrating Strings and Bars

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy

transport and transverse impedance. Longitudinal vibrations in bars-wave equation and its general solution. Special cases (i) bar fixed at both ends (ii) bar fixed at the midpoint (iii) bar fixed at one end. Tuning fork.

UNIT-V Ultrasonics:

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magneto strictive methods, detection of ultrasonics, determination of wavelength of ultrasonic waves. Applications and uses of ultrasonic waves.

REFERENCE BOOKS:

1. BSc Physics Vol.1, Telugu Academy, Hyderabad.
2. Fundamentals of Physics. Halliday/Resnick/Walker ,Wiley India Edition 2007.
3. Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
4. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
5. Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi,2004
6. Introduction to Physics for Scientists and Engineers. F.J. Buche. McGraw Hill.

SEMESTER-II

COURSE 4: WAVES AND OSCILLATIONS

Practical | Credits: 1 | 2hrs/week

COURSE OBJECTIVE:

This course provides students with a broad understanding of the physical principles of the oscillations, to help them develop critical thinking and quantitative reasoning skills, to empower them to think creatively and critically about scientific problems and experiments.

LEARNING OUTCOMES:

1. Students are made to determine the unknown frequency of tuning fork by volume resonator experiment
2. Students are made to determine 'g' by compound/bar pendulum
3. Students are made to determine the force constant of a spring by static and dynamic method.
4. Students are made to determine the elastic constants of the material of a flat spiral spring.
5. Students are made to verify the laws of vibrations of stretched string –sonometer
6. Students are made to determine the frequency of a bar –Melde's experiment.
7. Students are made to study the damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
8. Students are made to form Lissajous figures using CRO.

Minimum of 6 experiments to be done and recorded

Experiments

1. Volume resonator experiment
2. Determination of 'g' by compound/bar pendulum
3. Simple pendulum normal distribution of errors-estimation of time period and the error of the mean by statistical analysis
4. Determination of the force constant of a spring by static and dynamic method.
5. Determination of the elastic constants of the material of a flat spiral spring.
6. Coupled oscillators
7. Verification of laws of vibrations of stretched string –sonometer
8. Determination of frequency of a bar –Melde's experiment.
9. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
10. Formation of Lissajous figures using CRO.

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SEMESTER-I

PRINCIPLES OF PHYSICAL SCIENCES

Credits: 2 — 2 hrs/week

Course Objective:

The course "Principles of Physical Sciences " is designed to introduce arts students to fundamental concepts and principles of physical sciences, fostering a deeper understanding of the physical world and its interconnections with various disciplines.

Learning outcomes:

Upon completion of the course "Principles of Physical Sciences for Arts Students," students from arts backgrounds will be able to:

1. Understand the foundational principles of physical sciences: Students will develop a comprehensive understanding of the core principles and concepts in physical sciences.

2. Analyse and interpret scientific information: Students will acquire the ability to critically analyse scientific information and data related to physical sciences.

3. Apply physical science principles to real-world scenarios: Students will develop the skills to apply physical science principles to solve real-world problems and scenarios.

Syllabus:

Unit 1: Introduction to Physics

Nature of Physics: Overview of physics as a discipline, its scope, and its relationship to other sciences. Scientific Method in Physics: Introduction to the scientific method and its application in the study of physics. Measurement and Units: Understanding the principles of measurement, SI units, and the importance of accurate and precise measurements. Scalars and Vectors: Differentiating between scalars and vectors, understanding vector addition and subtraction.

Unit 2: Mechanics for Arts Students

Motion and Forces: Introduction to the principles of motion, including velocity, acceleration, and the laws of motion. Energy and Work: Understanding the concept of energy, different forms of energy, and the relationship between work and energy. Circular Motion: Exploring the principles of circular motion, centripetal force, and applications in real-world scenarios. Gravity: Introduction to the concept of gravity, Newton's law of universal gravitation, and its implications.

Unit 3: Waves and Optics for Arts Students

Waves: Understanding the properties and characteristics of waves, including wave types, wave motion, and wave interference. Sound Waves: Exploring the nature of sound waves, including properties of sound, sound propagation, and the Doppler effect. Light and Optics: Introduction to the behavior of light, reflection, refraction, and the formation of images by mirrors and lenses. Wave Optics: Understanding the principles of interference, diffraction, and polarization of light waves.

Reference Books:

1."Principles of Physics" by David Halliday, Robert Resnick, and Jearl Walker: This textbook covers the fundamental principles of physics, including mechanics, electromagnetism, thermodynamics, and modern physics. It provides a comprehensive introduction to the subject and includes numerous examples and exercises for practice.

2. "University Physics" by Hugh D. Young and Roger A. Freedman: This textbook is widely used in university-level physics courses. It covers a wide range of topics in classical physics, modern physics, and thermodynamics. It is known for its clear explanations and problem-solving approach.

3. "Concepts of Modern Physics" by Arthur Beiser: This book provides an introduction to the principles and concepts of modern physics, including quantum mechanics, atomic and nuclear physics, and relativity. It is suitable for students with a basic background in physics and mathematics.

4. "The Feynman Lectures on Physics" by Richard P. Feynman, Robert B. Leighton, and Matthew Sands: This three-volume set is based on the famous lectures given by physicist Richard Feynman. It covers a wide range of topics in physics, including mechanics, electromagnetism, quantum mechanics, and statistical mechanics. The lectures are known for their engaging style and intuitive explanations.

5. "Physical Science" by Bill Tillery: This textbook provides a comprehensive introduction to the principles of physical science, covering topics such as motion, forces, energy, waves, electricity, and magnetism. It is designed for introductory-level courses and includes numerous examples, illustrations, and practice problems.

6. "Fundamentals of Physics" by Jearl Walker, David Halliday, and Robert Resnick: This textbook is widely used in physics courses and covers the fundamental principles of classical physics. It includes a strong emphasis on problem-solving and conceptual understanding.

Student activities:

1. Conduct research on a famous physicist or a significant discovery in the field of physics. Write a short report highlighting the physicist's contributions or explaining the importance of the discovery. Include information about how the discovery impacted other scientific fields or technological advancements.

2. Watch videos or animations demonstrating circular motion, such as the motion of objects on a Ferris wheel or a car turning on a curved track. Identify the forces involved, including the centripetal force, and explain how they contribute to the object's circular motion. Discuss real-world examples where circular motion is significant, such as satellites orbiting the Earth.

3. Set up a wave demonstration using a rope or a slinky to visualize the properties of waves, such as wavelength, frequency, amplitude, and wave speed. Observe how these properties change when altering the parameters of the wave, such as tension or length.