KONGU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)

ERODE – 638 107

B.Sc (Physics)

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2021-2022

KONGU ARTS AND SCIENCE COLLEGE

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SYLLABUS

Sem	Course Code	Professional English - I	Total Marks: 100		Hours Per Week	Credits
I	21UAOCT101		CIA: 50	ESE: 50	4	4

Course Objectives:

1. To develop the language skills of students.
2. To enhance the lexical, grammatical, socio-linguistic and communicative competence.
3. To focus on developing students' knowledge in domain specific registers and the required language skills.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Identify the correct usage of vocabulary and grammar in speaking and writing.	**K1 - K4**
CO 2	Apply the language for speaking efficiently and confidently.	
CO 3	Build the reading skill by using unfamiliar texts with comprehension.	
CO 4	Demonstrate the language skills through academic writing.	
CO 5	Develop the leadership quality and team building through linguistic competence.	

K1: Remember, K2: Understand; K3: Apply; K4: Analyze ; K5:Evaluate; K6:Create

Unit - I	**Communication**

Listening: Listening to audio text and answering questions - Listening to Instructions.

Speaking: Pair work and small group work.

Reading: Comprehension passages - Differentiate between facts and opinion.

Writing: Developing a story with pictures.

Vocabulary: Register specific - Incorporated into the LSRW tasks.

Unit - II	**Description**

Listening: Listening to process description - Drawing a flow chart.

Speaking: Role play (formal context).

Reading: Skimming/Scanning - Reading passages on products, equipment and gadgets.

Writing: Process Description - Compare and Contrast Paragraph - Sentence Definition and Extended definition - Free Writing.

Vocabulary: Register specific - Incorporated into the LSRW tasks.

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Unit - III	Negotiation Strategies
Listening: Listening to interviews of specialists / Inventors in fields (Subject Specific). Speaking: Brainstorming (Mind Mapping) - Small group discussions (Subject Specific). Reading: Longer Reading text. Writing: Essay Writing (250 words). Vocabulary: Register specific - Incorporated into the LSRW tasks.	

Unit - IV	Presentation Skills
Listening: Listening to lectures. Speaking: Short talks. Reading: Reading Comprehension passages. Writing: Writing Recommendations - Interpreting Visuals inputs. Vocabulary: Register specific - Incorporated into the LSRW tasks.	

Unit - V	Critical Thinking Skills
Listening: Listening comprehension - Listening for information. Speaking: Making presentations (with PPT-practice). Reading: Comprehension passages - Note making. (Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills). Writing: Problem and Solution essay - Creative writing - Summary writing. Vocabulary: Register specific - Incorporated into the LSRW tasks.	

SKILL DEVELOPMENT ACTIVITIES	
1	Listening and Answering
2	Speaking Activities through Role play
3	Reading and Answering
4	Resume Preparation
5	Vocabulary Enhancement Activities: Definition, Synonyms, Antonyms, Keywords, etc.,

TEXT BOOK	
1.	Professional English for Physical Sciences-I - TANSCHE.

REFERENCE BOOKS	
1.	Simon Sweeney, English for Business Communication, Student's Book, Second Edition, Cambridge University Press, 2003.
2.	Michael McCarthy, Felicity O'Dell, English Vocabulary in Use: Advanced, First South Asian Edition, Cambridge University Press, 2003.

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WEB RESOURCES	
1.	https://nptel.ac.in/courses/109/104/109104030/
2.	https://www.edubull.com/courses/online-english-speaking-courses-video-english/tofel-ilets/basic-courses/professional-english-part-2

Course Designed By	Verified By	Approved By HOD
Mr.S.Muruganantham	Ms.S.Yasmin	Ms.R.Chitra

QUESTION PAPER PATTERN	
Time: 3 hours	**Max. Marks: 50**
SECTION - A (10 X 1 = 10 Marks)	**SECTION - B (4 X 10 = 40 Marks)**
(Vocabulary) (MCQ, Info-gap questions –domain specific vocabulary)	(Reading :Two long domain-specific comprehension passages with questions pertaining to understanding and analysis – 20 Marks) (Writing: Descriptive/narrative/persuasive writing questions pertaining to domain-specific vocabulary – 20 Marks)

Mapping of COs with POs and PSOs

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	S	S	S	S	S	M	M	S	M	M	S	S
CO 2	S	S	S	S	S	M	M	S	S	M	S	M
CO 3	S	S	M	M	M	M	S	S	S	M	S	M
CO 4	S	S	M	M	M	M	M	S	S	M	S	M
CO 5	S	S	S	S	M	S	S	S	S	S	S	S

S-Strong, M-Medium, L-Low

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Sem	Course code	Mechanics, Properties of Matter and Sound	Total Marks:100		Hours Per Week	Credits
I	21UAOCT102		CIA : 50	ESE : 50	4	4

Course Objectives:

1. To acquire the basics of mechanics and cognize the fundamentals of properties of matter
2. To familiarize the concepts of acoustics and production techniques
3. To acquire the skills of applying factual knowledge to practical situations

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Recollect and understand the concepts related to conservation laws, Elasticity, Gravitation, surface tension, viscosity and sound	K1 – K4
CO 2	Acquire the knowledge of essential equations to solve problems in Mechanics	
CO 3	Apply the indispensable principles of mechanics and properties of matter to realize the related applications	
CO 4	Learn and Investigate dynamical parameters related to daily life activities	
CO 5	Explore production methods and application of sound	

K1 :Remember; K2 :Understand; K3 :Apply; K4 :Analyze; K5:Evaluate; K6:Create

Unit –I : Conservation Law I

Introduction - Significance of Conservation laws - Concepts of Work, Power and Energy – Conservative Forces – Energy – Conservative force as negative gradient of potential energy – Non-conservative forces: General Law of conservation of energy – Conservation of Linear momentum – Collision – Elastic and Inelastic Collision – Final Velocities of Colliding Particles.

Unit – II : Conservation Law II & Motion of Rigid Body

Conservation Law II: Angular Momentum-Torque - Conservation of Angular Momentum – Motion of a Planet in an elliptical orbit around the sun

Motion of Rigid Body: Moment of Inertia-Radius of Gyration – Dimensions and units of Moment of Inertia – Analogous parameters in Translational and Rotational motion – General Theorems on Moment of Inertia - Calculation of Moment of Inertia: Rectangular Lamina and Spherical Shell.

Unit – III : Elasticity& Gravitation

Elasticity: Elastic Moduli – Relation between the Elastic Moduli – Expression for Torque per unit twist – Rigidity Modulus (Static Torsion method) - Bending Moment – Depression of the loaded end of a Cantilever – Determination of Young's modulus by uniform bending (Scale & Telescope) and non-uniform bending (Pin & Microscope).

Gravitation: Newton's Law of Gravitation - Kepler's Law of Planetary Motion – Boy's method for determining 'G' – Gravitational Field and Potential – Gravitational Potential and Field at a point due to Spherical Shell

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Unit – IV :	Surface Tension & Viscosity

Surface Tension: Introduction – Surface Energy and Surface Tension - Difference of Pressure across a Curved Surface – Angle of Contact – Determination of Angle of Contact – Capillarity - Jaeger's Experiment – Effect of Curvature on Evaporation and Condensation.

Viscosity: Definition and Co-efficient of Viscosity – Dimension - Poiseuille's method for Coefficient of Viscosity – Ostwald's Viscometer – Bernoulli's theorem for a Liquid along a Stream Line.

Unit – V :	Acoustics and Ultrasound

Classification of Sound – Reverberation (Measurement of Time and Absorption Coefficient) – Sabine's Reverberation formula – Properties of Stationary, Progressive, Transverse and Longitudinal Waves - Melde's Experiment for the Frequency of Electrically maintained Tuning Fork – Ultrasonic - Production of Ultrasonic Waves: Magnetostriction method – Piezo-electric method – Applications.

	SKILL DEVELOPMENT ACTIVITIES
1	Create a content on Moment of inertia for objects of different geometric shapes
2	Identify liquids of various surface tension/viscosity through literature survey and analyze the behavior in real life situations
3	Disseminate some qualitative ideas to peer group for good acoustics of buildings based on the concept of Sabine's Reverberation

	TEXT BOOKS
1	D.S. Mathur: Revised by Dr.P.S. Hemne – Mechanics – Revised Edition 2012, Reprint 2014 – S. Chand & Co. Pvt Ltd, New Delhi (UNIT - I & II)
2	R. Murugesan – Properties of Matter – Edition 2012 – S. Chand & Co. (UNIT - III)
3	Brijlal and N. Subramaniam - Properties of Matter – Edition 2005 – S. Chand & Co. (UNIT - IV)
4	Brijlal and N. Subramaniam – Text Book of Sound - Edition 1995 – S. Chand & Co. (UNIT – V)

	REFERENCE BOOKS
1	Mechanics, Properties of Matter and Sound – R. Murugesan, Edition 2002 – S. Chand & Co.
2	Physics I – V. Rajendran, A. Marikani – Tata McGraw-Hill Co.
3	Elements of Properties of Matter – D. S. Mathur, Edition 2013 – S. Chand & Co.
	WEB RESOURCES
1	**https://www.khanacademy.org/science/physics/torque-angular-momentum/torque-tutorial/v/more-on-moment-of-inertia**
2	**http://www.khanacademy.org/science/physics/elasticity/surface**
3	**https://youtu.be/5IhMAUDmlaE** (Mod-07 Lec-03 Piezoelectric Material -- II: Applications)

Course Designed By	Verified By	Approved By HOD
Mr.T.Venkashnarayana	Ms.K.Maithilee	Ms.R.Chitra

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QUESTION PAPER PATTERN		
Time: 3 hours		**Max. Marks: 50**
SECTION-A **(10 X 1 = 10 Marks)**	**SECTION-B** **(5 X 3 = 15 Marks)**	**SECTION-C** **(5 X 5 = 25 Marks)**
Answer ALL questions Choose the correct answer Two questions from each unit	Answer ALL questions Either or type Two questions from each unit	Answer ALL questions Either or type Two questions from each unit

Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	L	L	L	M	S	S	S	S	M	M
CO2	S	S	L	L	L	M	S	S	S	M	M	M
CO3	S	S	S	S	M	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	S	S	M	S	S
CO5	S	L	L	S	L	M	S	M	M	M	L	M

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Allied I: Chemistry I	Total Marks: 75		Hours Per Week	Credits
I	21UAOAT103		CIA: 30	ESE: 45	4	3

Course Objectives:

- To understand the importance of Atomic structure, Bonding, Solutions and chemical Kinetics.
- To gain the knowledge about Phytochemistry and Industrial Chemistry

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Illustrate the structural elucidation of organic compounds.	K1 - K4
CO 2	Summarize the fundamentals of physical chemistry	
CO 3	Recall the bonding mechanisms and theories of inorganic compounds	
CO 4	Establish the knowledge in polymer chemistry	
CO 5	Classify the different laws of physical chemistry	

K1: Remember; K2: Understand; K3:Apply; K4:Analyze; K5:Evaluate; K6:Create

Unit - I — Nuclear Chemistry and Molecular orbital Theory

Laboratory principles: Safety and Hygiene in the Chemistry Lab: Storage and Handling of Chemicals. Antidotes and First Aid procedures in chemistry lab.

Nuclear Chemistry: Definition of Atoms, Molecules, Proton, Neutron, Electron, Atomic weight, Atomic number, Isotopes, Isobars, Isotones, Nuclear Fusion and Nuclear Fission.

Chemical bond: Definition of Covalent bond, Ionic bond, Coordinate covalent bond, Hydrogen bond and Vander Waal's Forces.

Molecular Orbital Theory: Concepts of M.O. Theory – Comparison of Bonding and Anti-bonding molecular orbitals, Bond order, Diamagnetism and Para magnetism. Applications of M.O Theory – H_2, N_2, O_2 and F_2.

Unit - II — Plastics, Silicones, Dyes and Fertilizers

Plastics: Preparation, Properties and Uses of Poly Vinyl Chloride, Teflon, Polythene and Epoxy Resins. Difference between thermoplastic and Thermosetting polymers.

Silicones: Preparation, Properties and Uses.

Dye: Definition of Chromophore and Auxochrome. Preparation, Properties and Uses of Azo dye (Methyl orange) and Vat dye (Indigo).

Fertilizers: Preparation and uses of Ammonium Sulphate, Ammonium Nitrate, Urea and Triple Super Phosphate.

Unit - III — Covalent bond, Polar effects and Stereoisomerism

Covalent Bond: Orbital Overlap, Hybridization, Geometry of organic molecules - CH_4, C_2H_2, C_2H_4 and C_6H_6.

Polar Effects: Inductive effect, Electromeric, Mesomeric and Steric effects.

Stereoisomerism: Optical isomerism - Elements of symmetry. Isomerism in Tartaric acid. Racemisation and Resolution. Geometric isomerism - Maleic acid and Fumaric acid.

Unit - IV — Solutions and Chemical kinetics

Solutions: Definition of Normality, Molality and Molarity. Types of Solutions. Raoult's law: Statement, Ideal solution - Deviation from ideal behavior. Binary liquid mixtures. Fractional Distillation.

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Chemical Kinetics: Introduction, Difference between the Order and Molecularity of the reaction, Methods of Determination of Order of reaction. Effect of Temperature on the reaction rate.

Unit - V	Photo Chemistry and Metallic Bond

Photochemistry: Definition of Photochemical reaction, Comparison of Thermal and Photochemical reaction. Laws of Photochemistry - Grothus Drapers law and Strak Einstein's Law. Quantum yield; Photosensitization - Fluorescence, Phosphorescence and Chemiluminescence.

Metallic Bond: Electron Gas, Pauling and Band Theories, Semiconductors - Extrinsic and Intrinsic.

SKILL DEVELOPMENT ACTIVITIES

1	Chart/Model preparation on atomic structure of elements
2	Report on different types of fertilizers and dyes used in industries around your locality
3	Summary on any one Noble Laureate and his contribution in Chemistry

TEXT BOOKS

1	R. D. Madan, Advanced Inorganic Chemistry, S. Chand & Company, 5th Edition, 2005
2	B. S. Bahl and ArunBahl, Advanced Organic Chemistry, S. Chand and Company Ltd, 1st Edition, 2017
3	B. S. Bahl, G. D. Tuli and ArunBahl, Essential of Physical Chemistry, S. Chand and Company Ltd, 3rd Edition,2007
4	Dr. V. Veeraiyan, Allied Chemistry Paper I & II, 2nd Edition, HpH publications, Chennai

REFERENCE BOOKS

1	B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, 33rd Edition, Vishal Publication, 2017
2	B. R. Puri, L.R. Sharma and Madan S.P athania, Elements of Physical chemistry, 30th Edition, Vishal Publication, 2017
3	R.Gopalan, Analytical chemistry: S.Chand& Co., 2007

WEB RESOURCES

1	https://epgp.inflibnet.ac.in/
2	http://chemed.chem.purdue.edu/genchem/beginners.html

Course Designed By	Verified By	Approved By HOD
Mr. G. KARTHIKEYAN	Mr. R. RASU	Ms.R.Chitra

QUESTION PAPER PATTERN

Time: 3 hours		Max. Marks: 45
SECTION - A (5 X 1 = 5 Marks) Answer ALL questions Choose the correct answer	SECTION - B (5 X 3 = 15 Marks) Answer ALL questions Either or type	SECTION - C (5 X 5 = 25 Marks) Answer ALL questions Either or type

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Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	S	M	M	M	M	S	S	M	M	S	S
CO 2	M	S	M	M	M	M	S	S	S	M	S	S
CO 3	M	S	M	M	M	M	S	S	M	M	S	S
CO 4	M	S	M	M	M	S	S	S	S	M	S	S
CO 5	S	S	M	M	S	M	S	S	M	S	S	S

S - Strong, M - Medium, L - Low

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Sem	Course Code	Professional English - II	Total Marks: 50		Hours Per Week	Credits
II	21UAOCT201		CIA: 50	ESE: 50	4	4

Course Objectives:

1. To develop their competence in the use of English with particular reference to the workplace situation.
2. To enhance the creativity of the students which will enable them to think of innovative ways to solve issues in the workplace.
3. To develop their competence and competitiveness and thereby improve their employability skills.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Identify the importance of linguistic competence in workplace situations	**K1 - K4**
CO 2	Develop LSRW skills for academic and career purposes	
CO 3	Build the employability skills through various speaking and writing tasks	
CO 4	Relate the communication skills suitable for employability	
CO 5	Illustrate the digital competence with innovation and imagination	

K1: Remember; K2: Understand; K3: Apply; K4: Analyze ; K5:Evaluate; K6:Create

Unit - I	**Communicative Competence**

Listening: Listening to two talks/lectures by specialists on selected subject specific topics - (TED Talks) and answering comprehension exercises (inferential questions).

Speaking: Small group discussions (the discussions could be based on the listening and reading passages - open ended questions).

Reading: Two subject-based reading texts followed by comprehension activities/exercises.

Writing: Summary writing based on the reading passages.

Unit - II	**Persuasive Communication**

Listening: Listening to a product launch- sensitizing learners to the nuances of persuasive communication.

Speaking: Debates - Just-A Minute Activities

Reading: Reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions.

Writing: Dialogue writing- Writing an argumentative / persuasive essay.

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Unit - III	Digital Competence

Listening: Listening to interviews (subject related).

Speaking: Interviews with subject specialists (using video conferencing skills) - Creating Vlogs (How to become a vlogger and use vlogging to nurture interests – subject related).

Reading: Selected sample of Web Page (subject area).

Writing: Creating Web Pages.

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

The essay will address all aspects of digital competence in relation to MS Office and how they can be utilized in relation to work in the subject area.

Unit - IV	Creativity and Imagination

Listening: Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites - E.g. https://www.youtube.com/watch?v=tpvicScuDy0).

Speaking: Making oral presentations through short films - subject based.

Reading: Essay on Creativity and Imagination (subject based).

Writing - Basic Script Writing for short films (subject based) - Creating blogs, flyers and brochures (subject based) - Poster making - writing slogans/captions (subject based).

Unit - V	Workplace Communication and Basics of Academic Writing

Speaking: Short academic presentation using PowerPoint.

Reading & Writing: Product Profiles, Circulars, Minutes of Meeting.

Writing an introduction, Paraphrasing, Punctuation (period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis), Capitalization (use of upper case).

SKILL DEVELOPMENT ACTIVITIES	
1	Group Discussion
2	Persuasive Speaking – Conversation
3	Listening Activities – Watching videos and answering questions and summarizing the content
4	Creative writing – Flyers, Brochures, Slogans, Captions
5	Powerpoint Presentation

TEXT BOOK	
1.	Professional English for Physical Sciences-II - TANSCHE.

REFERENCE BOOKS	
1.	Alice Oshima & Ann Hogue, Writing Academic English, Second Edition, Addison Wesley Publishing Company, 1991.

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2.	Lyn R. Clark, Kenneth Zimmer, Joseph Tinervia Business English and Communication. Seventh Edition, MacMillan / McGraw-Hill, Imprint 1991.

WEB RESOURCES

1.	https://www.coursera.org/learn/speak-english-professionally
2.	https://www.ted.com/talks/pranav_rajan_computer_science_education

Course Designed By	Verified By	Approved By HOD
Mr.S.Muruganantham	Ms.S. Yasmin	Ms.R.Chitra

QUESTION PAPER PATTERN

Time: 3 hours	Max. Marks: 50
SECTION - A (10 X 1 = 10 Marks)	**SECTION - B (4 X 10 = 40 Marks)**
(Vocabulary) (MCQ, Info-gap questions –domain specific vocabulary)	(Reading :Two long domain-specific comprehension passages with questions pertaining to understanding and analysis – 20 Marks). (Writing: Descriptive/narrative/persuasive writing questions pertaining to domain-specific vocabulary – 20 Marks)

Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	S	S	S	M	S	M	M	S	S	M	S	M
CO 2	S	S	M	S	M	M	S	S	S	M	S	S
CO 3	S	S	S	M	S	M	M	S	S	M	S	S
CO 4	S	S	M	S	S	M	S	S	S	M	S	S
CO 5	S	S	S	M	M	M	M	S	S	M	S	M

S-Strong, M-Medium, L-Low

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Sem	Course code	Thermal and Statistical Physics	Total Marks:100		Hours Per Week	Credits
II	21UAOCT202		CIA : 50	ESE :50	4	4

Course Objectives:

1. To study the basic principles of Thermodynamics and Low temperature Physics
2. To gain knowledge over Statistical Physics
3. To develop scientific inquiry skill and understand the working mechanism of heat engines

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Remember the methods of heat transmission and understand the underlying principles of kinetic theory of gases	K1 – K4
CO 2	Attain theoretical knowledge to distinguish real and ideal gases to understand equations of state	
CO 3	Apply thermodynamic principles to realize the working of various thermodynamical systems	
CO 4	Analyze various thermodynamic processes	
CO 5	Classify the systems based on distribution concepts of Statistical Physics	

K1 :Remember; K2 :Understand; K3 :Apply; K4 :Analyze; K5:Evaluate; K6:Create

Unit –I : Transmission of Heat & Radiation

Transmission of Heat: Conduction, Convection and Radiation – Co-efficient of Thermal Conductivity - Lee's Disc method for Bad Conductors - Cylindrical Flow of Heat - Thermal Conductivity of Rubber.

Radiation: Black body – Emissive and Absorptive Power – Distribution of Energy in Black Body Spectrum - Wien's Displacement Law - Rayleigh-Jean's Law - Stefan's Law - Determination of Stefan's Constant (Laboratory Method).

Unit – II : Kinetic Theory of Gases

Postulates of Kinetic Theory of Gases -Expression for the Pressure exerted by a Gas – Deduction of Boyle's Law – Derivation of Gas Equation – Derivation of Gas Laws - Degrees of Freedom - Maxwell's law of Equipartition of Energy – Vander Waal's Equation of State – Estimation of Critical Constants - Mean Free Path – Expression for Mean Free Path.

Unit – III : Low Temperature Physics

Joule – Thomson's effect - Porous plug experiment – Expression for the Joule-Thomson cooling produced in a Vander Waals gas – Liquefaction of gases: Regenerative cooling – Air-Linde's process – Claude's process – Liquefaction of Hydrogen and Helium - Practical applications of low temperatures – Refrigeration – Electrolux refrigerator – Frigidaire – Air-conditioning - Air conditioner.

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Unit – IV :	Laws of Thermodynamics & Entropy

Laws of Thermodynamics: Concept of Heat and Work - First law of Thermodynamics – Isothermal and Adiabatic Process – Adiabatic Equation of a Perfect Gas – Slopes of Adiabatic and Isothermals – Reversible and Irreversible Process - Carnot's Heat Engine – Second Law of Thermodynamics.

Entropy: Concept of Entropy - Change in Entropy – Change of Entropy in a Reversible Process and Irreversible Process – Temperature Entropy Diagram – Entropy of a Perfect Gas – Third law of Thermodynamics – Zero Point Energy – Maxwell's Thermodynamical Relations – Helmholtz Free Energy – Enthalpy – Clausius-Clapeyron's Equation (First Latent Heat Equation).

Unit – V :	Statistical Physics

Introduction - Phase Space – Micro states and macro states – Thermodynamic probability – Boltzmann's theorem on entropy and probability – Fundamental postulates of statistical mechanics – Statistical equilibrium – Ensembles – Derivation of Maxwell-Boltzmann distribution law – Application of Maxwell-Boltzmann distribution law to an ideal gas: Molecular energies in an ideal gas, Maxwell-Boltzmann velocity distribution law – Quantum statistics of identical particles – Derivation of Bose-Einstein distribution law – Applications of Bose Einstein statistics (Planck radiation formula) – Derivation of Fermi-Dirac distribution law – Comparison of three statistics.

SKILL DEVELOPMENT ACTIVITIES

1	Presentation (video) on thermal behaviour of various materials/cryogenics
2	Analyze and prepare a report on the second law of thermodynamics in practical implications (Example: Temperature of Air conditioner and Refrigerator, Efficiency of petrol/diesel/gas vehicle, etc,.)
3	Group Discussion on formulae and problems related to Statistical Physics, commonly occur in Entrance Examinations

TEXT BOOKS

1	Brijlal and N. Subramaniam – Heat, Thermodynamics & Statistical Physics - Edition 2010 - S. Chand & Co. (UNIT – I to IV)
2	R. Murugesan and Er. Kiruthiga Sivaprasath - Thermal Physics - Edition 2012, Reprint 2013 - S. Chand & Co. (UNIT – V)

REFERENCE BOOKS

1	Heat & Thermodynamics – Agarwal and Prakash – Edition 2014 – Pragati Prakashan Publisher.
2	Heat & Thermodynamics – D.S. Mathur, Edition 2002, S. Chand & Co.

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	WEB RESOURCES
1	http://nptel.ac.in
2	https://www.khanacademy.org/science/ap-chemistry/thermodynamics-ap/entropy-tutorial-ap/v/introduction-to-entropy
3	https://www.askiitians.com/revision-notes/physics/thermodynamics/

Course Designed By	Verified By	Approved By HOD
Mr.T.Akashnarayana	Ms.K.Maithilee	Ms.R.Chitra

QUESTION PAPER PATTERN		
Time: 3 hours		**Max. Marks: 50**
SECTION - A (10 X 1 = 10 Marks)	**SECTION - B (5 X 3 = 15 Marks)**	**SECTION - C (5 X 5 = 25 Marks)**
Answer ALL questions (Multiple choice, Four options) Two questions from each unit	Answer ALL questions (Either or type) Two questions from each unit	Answer ALL questions (Either or type) Two questions from each unit

Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	L	M	M	S	S	S	S	S	M	L
CO2	S	S	M	L	M	M	S	S	S	M	M	M
CO3	S	S	S	S	M	S	M	S	S	M	S	M
CO4	S	S	S	S	S	S	L	M	S	M	S	S
CO5	S	M	M	L	L	M	S	M	L	L	L	M

S-Strong, M-Medium, L-Low

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REFERENCE BOOK	
1	A. Venkateshwaran, R. Veeraswamy and A. R. Kulanthaivelu, S.Chand& Company Limited, 1st Edition, 2001
WEB RESOURCES	
1	https://vlab.amrita.edu/index.php?sub=2&brch=193
2	http://www.iscnagpur.ac.in/study_material/dept_chemistry/3.1_MIS_and_NJS_Manual_for_Organic_Qualitative_Analysis

Course Designed By	Verified By	Approved By HOD
S. Natarajan Mr. S. NATARAJAN	R. Rasu Mr. R. RASU	R C U Ms.R.Chitra

Parameters		
Volumetric Analysis	**Organic Analysis**	**Record**
8	**12**	**05**

Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	S	M	M	M	S	M	S	S	S	M	S	M
CO 2	S	M	M	M	S	M	S	S	M	S	M	S
CO 3	S	M	M	M	S	M	S	S	S	S	S	M
CO 4	S	M	M	M	S	M	S	M	M	S	S	S
CO 5	S	M	M	M	S	M	S	S	S	M	S	M

S - Strong, M - Medium, L - Low

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Sem	Course code	Core Practical – I	Total Marks:75		Hours Per Week	Credits
I & II	21UAOCP203		CIA : 30	ESE : 45	2	3

Course Objectives:

1. To provide a platform to inter-relate Physics principles
2. To offer basic laboratory training
3. To gain practical skills on laboratory measurements

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Recognize the relation between theory and experiment	K1-K4
CO 2	Acquire the fundamental knowledge on resonance	
CO 3	Explore the phenomenon of diffraction to experimental situations	
CO 4	Analyze Thermodynamic principles in practical aspects	
CO 5	Evaluate the properties of viscosity and surface tension of various liquids	

K1 :Remember; K2 :Understand; K3 :Apply; K4 :Analyze; K5:Evaluate; K6:Create

S. No	Experiments (Any Fourteen Experiments)
1	Compound Bar Pendulum
2	Young's Modulus – Non-uniform bending – Pin & Microscope
3	Young's Modulus – Uniform bending – Pin & Microscope
4	Young's Modulus – Non -uniform bending – Optic Lever
5	Young's Modulus – Uniform bending – Optic Lever
6	Young's Modulus – Cantilever – Deflection method
7	Rigidity Modulus – Static Torsion – Scale & Telescope
8	Rigidity Modulus – Torsion Pendulum (With Symmetrical Masses)
9	Sonometer – Frequency of A. C
10	Sonometer – Verification of Laws
11	Spectrometer – Refractive Index of Solid Prism
12	Spectrometer – (i-d) curve
13	Spectrometer – Dispersive Power of Grating
14	Spectrometer – Narrow Angled Prism
15	Thermal Conductivity of a Bad Conductor – Lee's Disc
16	Specific Heat Capacity by Cooling – Newton's Law of Cooling
17	Viscosity by Capillary flow Method
18	Comparison of Viscosities - Capillary flow Method
19	Surface tension of a liquid – Drop Weight Method

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	Demonstration
1	Specific Heat Capacity – Joule's Calorimeter
2	Ultrasonic Interferometer – Compressibility of a liquid

REFERENCE BOOKS	
1	A text book of practical Physics - M.N.Srinivasan, S.Balasubramanian, R.Ranganathan – Edition 2017 - Sultan Chand&Sons
2	Advance Practical Physics – S.P.Singh –Edition 2013- Pragati Prakashan Publisher.
	Web Resources
1	https://vlab.amrita.edu/

Course Designed By	Verified By	Approved By HOD
Mr.T.Akashnarayana	Ms.K.Maithilee	Ms.R.Chitra

S.No.	Parameters	Maximum Marks
1.	Record	5
2.	Experiment [Formula & Circuit diagram (if applicable) - 20 marks; Tabulation - 5 marks]	25
3.	Result [Observation - 10 marks; Calculation - 5 marks]	15
	Total	**45**

Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	M	M	M	M	S	S	S	S	M	S
CO2	S	L	L	L	M	M	S	S	S	L	L	M
CO3	S	M	M	M	M	M	M	S	S	L	M	M
CO4	S	M	M	M	M	S	M	S	S	M	S	S
CO5	S	L	M	M	L	S	S	M	M	L	S	M

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Allied II: Chemistry II	Total Marks: 75		Hours Per Week	Credits
II	21UAOAT204		CIA: 30	ESE: 45	4	3

Course Objectives:

- To understand the importance of metallurgy and Coordination Chemistry
- To obtain the knowledge about chemistry of Aromatic compounds, Thermodynamics and Electrochemistry.

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Identify the basic concepts of organic and inorganic chemistry.	K1 - K4
CO 2	Summarize the fundamentals of physical chemistry	
CO 3	Describe the theories of coordination compounds and laws of thermodynamics.	
CO 4	Develop basic knowledge with the synthesis of organic compounds	
CO 5	Recall the properties of organic compounds and extraction method of different metals	

K1:Remember; K2:Understand; K3:Apply; K4:Analyze; K5: Evaluate; K6:Create

Unit - I — Metallurgy

Definition of Ores and its types, Mineral, Mining, Flux, Slag and Poling.

General methods of extraction of metals: Ore dressing (Physical and Chemical), Reduction methods, Refining methods - Zone refining and Van Arkel Zones refining. Extraction process of Uranium.

Furnaces: Blast and Reverberatory furnaces.

Unit - II — Coordination Chemistry

Definition of Complex ion, Central ion, Ligand, Coordination bond, Coordination number, Coordination sphere, Chelate complex, Unidentate and Bidentate Ligands. Nomenclature of Mononuclear complexes.

Theories: Werner, Sidge Wick Effective Atomic Number and Pauling's Valence bond theory.

Chelation: EDTA - Structure and uses, Determination of Hardness of water using EDTA, Structure of Hemoglobin and Chlorophyll.

Unit - III — Aromatic and Heterocyclic Compounds

Aromatic Compounds: Definition of Aromaticity, Huckel's rule. Mechanism of Nitration, Halogenation, Alkylation, Acylation and Sulphonation.

Naphthalene: Structural elucidation, Preparation, Properties and Uses.

Heterocyclic Compounds: Preparation and Properties of Pyrrole and Furan.

Unit - IV — Energetics

Energetics: System (Open, Closed & Isolated), Surroundings, Difference between the Reversible, Irreversible process and Comparison of Isothermal and Adiabatic Process.

First law of Thermodynamics (Definition only), Carnot cycle, Carnot theorem, Joule Thomson Effect, Definitions of Enthalpy, Bond energy, Entropy, Free energy

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Unit - V	Electrochemistry and Phase rule

Electrochemistry: Kohlraush's law and its application. Conductometric titration. pH determination - Galvanic cells, EMF Standard electrode potentials, Reference electrodes (Calomel Electrode). Electrochemical series and its applications. Principles of Electroplating.

Phase Rule: Definition of terms in Phase rule. Study of a simple Eutectic system: Pb-Ag.

	SKILL DEVELOPMENT ACTIVITIES
1	Poster presentation on Chemistry in everyday life
2	Chart preparation for the reaction mechanism
3	Report writing on the process involved in the extraction of metals from ores

	TEXT BOOKS
1	R. D. Madan, Advanced Inorganic Chemistry, S. Chand & Company, 5th Edition, 2005
2	B. S. Bahl and ArunBahl, Advanced Organic Chemistry, S. Chand and Company Ltd, 1st Edition, 2017
3	B. S. Bahl, G. D. Tuli and ArunBahl, Essential of Physical Chemistry, S. Chand and Company Ltd, 3rd Edition,2007
4	Dr. V. Veeraiyan, Allied Chemistry Paper I & II, 2nd Edition, HpH publications, Chennai
5	Dr. S. Rajan, Manual for Medical Laboratory Technology, 1st edition, Anjanaa Book House, Chennai, 2012

	REFERENCE BOOKS
1	B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, 33rd Edition, Vishal Publication, 2017
2	B. R. Puri, L.R. Sharma and Madan S.P athania, Elements of Physical chemistry, 30th Edition, Vishal Publication, 2017
3	R.Gopalan, Analytical chemistry: S.Chand& Co., 2007.

	WEB RESOURCES
1	https://epgp.inflibnet.ac.in/
2	http://chemed.chem.purdue.edu/genchem/beginners.html

Course Designed By	Verified By	Approved By HOD
Mr. G. KARTHIKEYAN	Mr. R. RASU	Ms.R.Chitra

QUESTION PAPER PATTERN

Time: 3 hours		Max. Marks: 45
SECTION - A (5 X 1 = 5 Marks)	**SECTION - B (5 X 3 = 15 Marks)**	**SECTION - C (5 X 5 = 25 Marks)**
Answer ALL questions	Answer ALL questions	Answer ALL questions
Choose the correct answer	Either or type	Either or type
Two questions from each unit	Two questions from each unit	Two questions from each unit

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Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	S	M	M	M	M	S	S	M	M	S	S
CO 2	M	S	M	M	M	M	S	S	S	M	S	S
CO 3	M	S	M	M	M	M	S	S	M	M	S	S
CO 4	M	S	M	M	M	S	S	S	S	M	S	S
CO 5	S	S	M	M	S	M	S	S	M	S	S	S

S-Strong, M-Medium, L-Low

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Sem.	Course Code	Allied Practical I - Chemistry	Total Marks: 50		Hours Per Week	Credits
I & II	21UAOAP205		CIA: 25	ESE: 25	2	2

(Examination at the end of Second Semester)

Course Objectives:

- To understand the meaning volumetric analysis.
- To know about the analysis of organic compounds

Course Outcomes (CO): On completion of the course, students should be able to

CO 1	Practice the preparation procedure of normal and molar solutions.	K1 – K5
CO 2	Develop the experience in handling of glass wares and accurate chemical laboratory skill.	
CO 3	Estimate the acid and base solutions by volumetric analysis	
CO 4	Examine the methods of organic analysis	
CO 5	Distinguish the various organic compounds.	

K1:Remember; K2:Understand; K3:Apply; K4:Analyze; K5: Evaluate; K6:Create

Unit I - III	Volumetric Analysis

1. Estimation of Sodium hydroxide using Standard Sodium carbonate.
2. Estimation of Hydrochloric acid using Standard Oxalic acid.
3. Estimation of Oxalic acid using Standard Sulphuric acid.
4. Estimation of Ferrous sulphate using Standard Mohr salt solution.
5. Estimation of Calcium
6. Estimation of Magnesium
7. Determination of Hardness of Water using EDTA

Unit IV - V	Qualitative Organic Analysis: Systematic Analysis

1. Detection of Element - Nitrogen compounds only.
2. To distinguish between Aliphatic and Aromatic compounds.
3. To distinguish between Saturated and Unsaturated compounds.
4. Functional group tests for Phenols, Acids (mono and di), Aromatic primary amine, Carbohydrates, Monoamide and Diamide, - Functional groups characterized by Confirmatory test

TEXT BOOK

1 A. O. Thomas, Practical Chemistry, Scientific Book Centre, Cannanore, 2003

REFERENCE BOOK	
1	A. Venkateshwaran, R. Veeraswamy and A. R. Kulanthaivelu, S.Chand& Company Limited, 1st Edition, 2001
WEB RESOURCES	
1	https://vlab.amrita.edu/index.php?sub=2&brch=193
2	http://www.iscnagpur.ac.in/study_material/dept_chemistry/3.1_MIS_and_NJS_Manual_for_Organic_Qualitative_Analysis

Course Designed By	Verified By	Approved By HOD
S. Natarajan Mr. S. NATARAJAN	R. Nat Mr. R. RASU	R C U Ms.R.Chitra

Parameters		
Volumetric Analysis	**Organic Analysis**	**Record**
8	**12**	**05**

Mapping of COs with POs and PSOs:

PO/PSO / CO	PO							PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	S	M	M	M	S	M	S	S	S	M	S	M
CO 2	S	M	M	M	S	M	S	S	M	S	M	S
CO 3	S	M	M	M	S	M	S	S	S	S	S	M
CO 4	S	M	M	M	S	M	S	M	M	S	S	S
CO 5	S	M	M	M	S	M	S	S	S	M	S	M

S - Strong, M - Medium, L - Low

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KONGU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)

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ACTIVITIES

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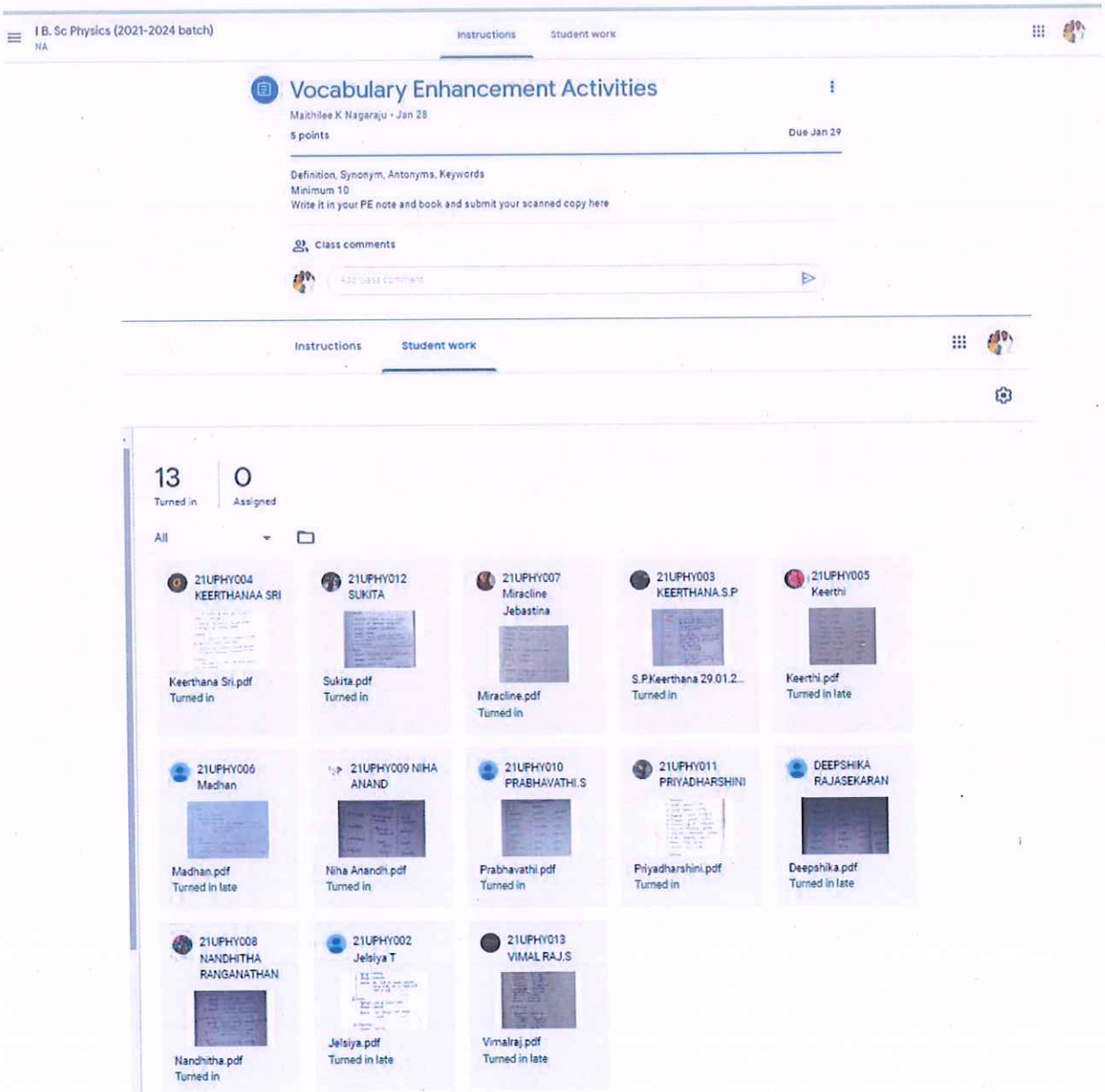
DEPARTMENT OF PHYSICS

Vocabulary Enhancement Activities on 29.01.2022

Objective: To explore unknown words with its correct meaning to use daily

Outcome: Learnt new words that can be used day-to-day



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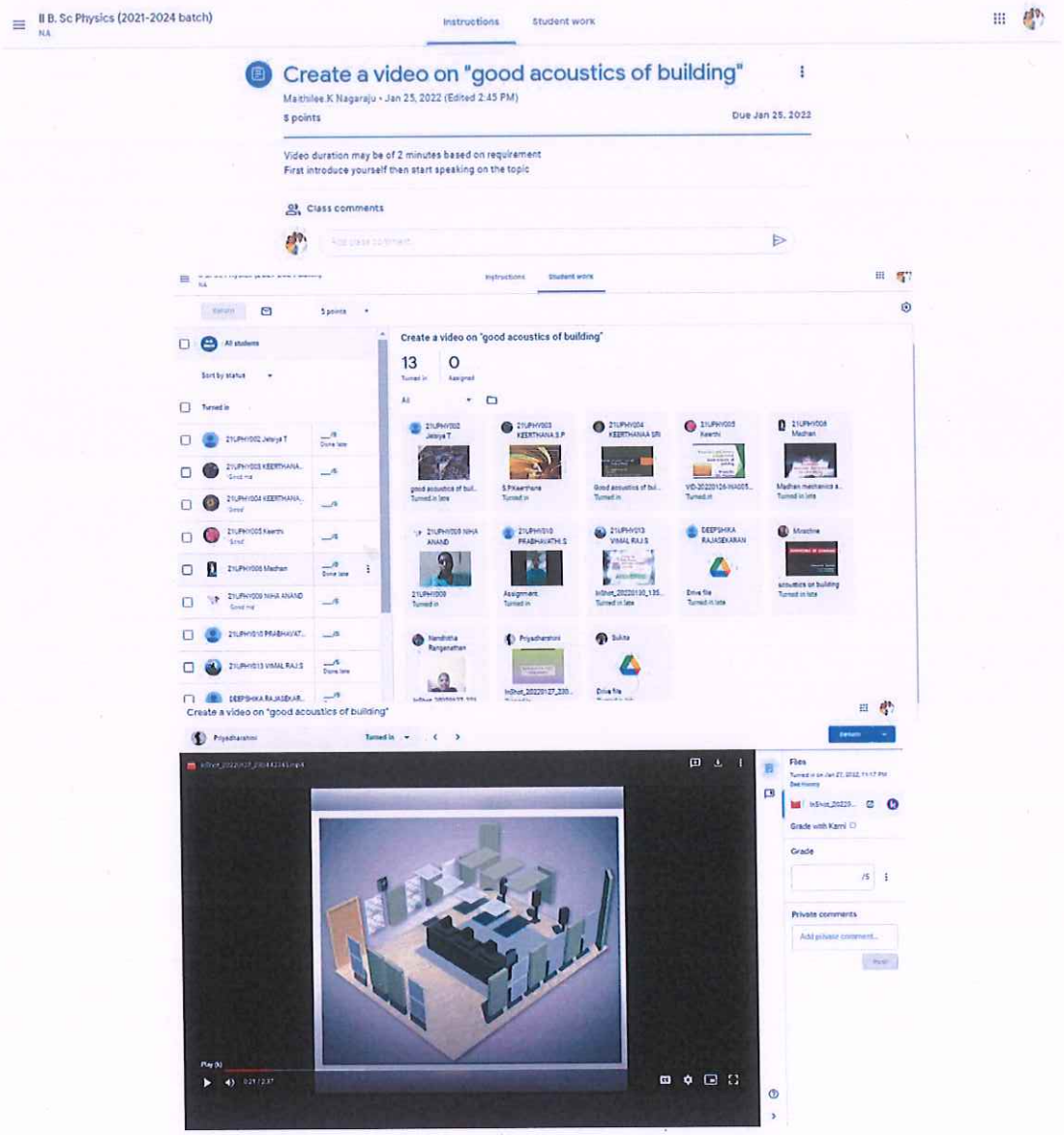
DEPARTMENT OF PHYSICS

Video content creation on "Good acoustics of buildings" on 25.01.2022

Objective: To acquire knowledge of Acoustics in Contemporary construction

Outcome: Students gained the practical knowledge about acoustics such as noise control, acoustical tools, good absorbing materials, etc., while constructing the building by creating video content



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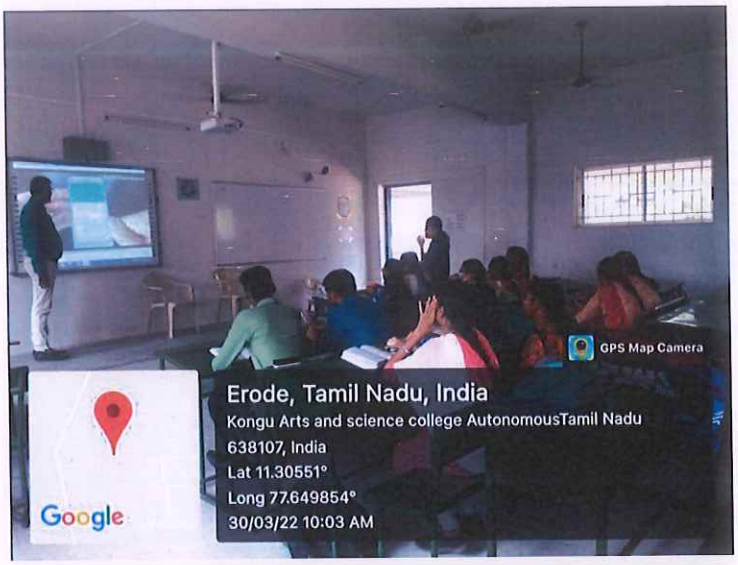
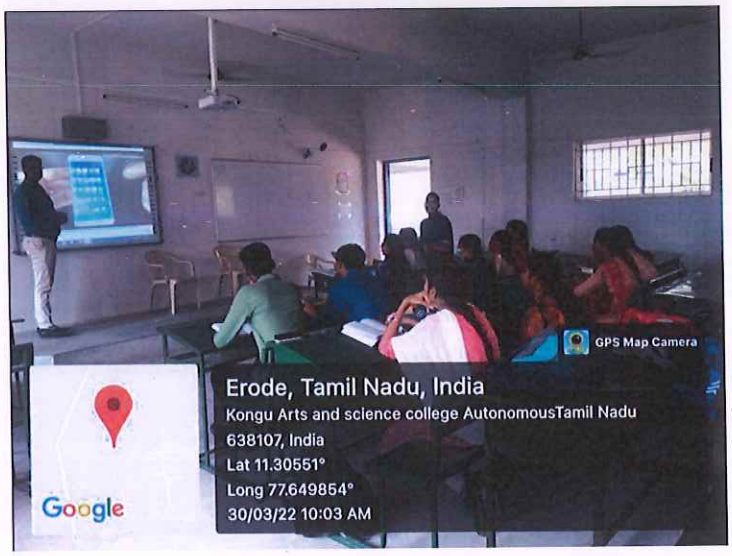
DEPARTMENT OF PHYSICS

Watching videos and answering questions and summarizing the content on 30.03.2022

Objective: To watch the video and students are made to answer the question that follows and are asked to summarize on the content

Outcome: Enhanced listening, analyzing and summarizing skills of the students





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DEPARTMENT OF PHYSICS

Group Discussion on 30.03.2022

Objective: Discussion on formulae and problems on Statistical Physics

Outcome: General knowledge on problems that are commonly asked in entrance examinations

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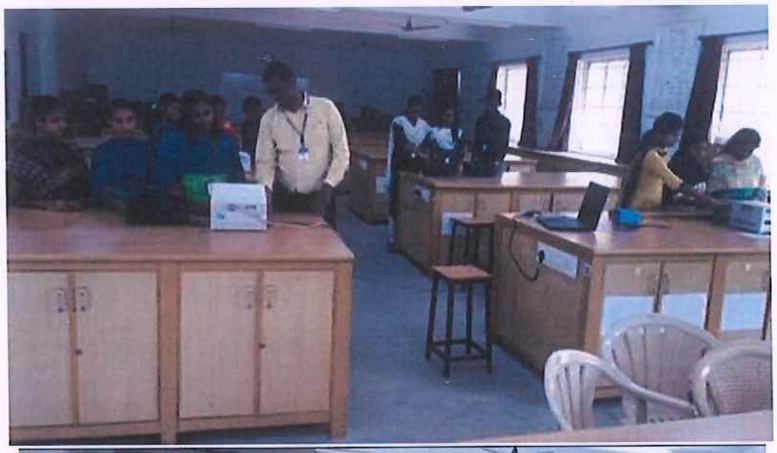
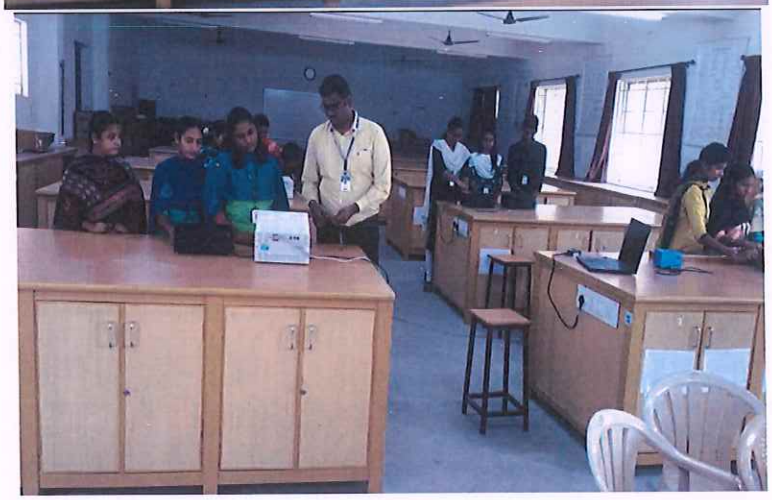
DEPARTMENT OF PHYSICS

Skill Development Training on

"Basic Lab Equipments"- 05.10.2021

A Skill Development Training on "Basic Lab Equipments" was organized by the Department of Physics to I B.Sc., Physics Students. During the training, students were instilled with the working principles of basic lab equipments by our faculty members. Students were taught about the proper handling of instruments like DSO, CRO, IC regulated power supply, Function generator, Ballistic Galvanometer, etc., First Year UG students (13) gained practical knowledge on Physics Laboratory Equipments.





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