KONGU ARTS AND SCIENCE COLLEGE

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

ERODE – 638 107

B.Sc (Biochemistry)

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2021-2022

KONGU ARTS AND SCIENCE COLLEGE

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SYLLABUS

Sem.	Course Code	Core I: Professional English I	Total Marks: 100		Hours / Week	Credits
I	21UAPCT101		CIA: 50	ESE: 50	4	4

Course Objectives:

1. To develop the language skills of students
2. To enhance the lexical, grammatical and socio-linguistic and communicative competence
3. To focus on developing students' knowledge of 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	Demonstrate the language skills through academic writing	
CO 3	Apply the communicative skills by responding to given situations	
CO 4	Communicate leadership quality and team building	
CO 5	Analyze the information in various circumstances	

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.

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

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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	Max. Marks (10)
Creation of a Mindmap	3
Interpreting a Interview by a Subject Expert	3
Reading and Summarizing a Subject related Research Article	3
Punctuality	1

TEXT BOOK	
1	Professional English for Life Sciences - TANSCHE
REFERENCE BOOK	
1	A Handbook of English for Engineers and Technologists. BS Publications. Eliah P, 2003.
2	English for Professionals, Vayu Education of India, Dr.Sheema Miglani & Shikha Goyal, 2010.
3	Business English, Tata McGraw-Hill Edition, Dona J.Young, 2012
WEB RESOURCES	
1	https://www.classcentral.com/course/swayam-business-english-communication-10097

Course Designed By	Verified By	Approved By HOD
Ms. R. S. CINDHU	Dr. N. SANGEETHA	Dr. A. K. VIDYA

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QUESTION PAPER PATTERN	
Time: 3 hours	**Max. Marks: 50**
SECTION - A (10 X 1 = 10 Marks) (Vocabulary) (MCQ, Info-gap questions –domain specific vocabulary)	**SECTION-B (4 X 10 = 40 Marks)** (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	M	M	S	M	S	S	S	S
CO 2	S	S	S	M	M	M	S	M	S	S	S	M
CO 3	S	S	S	S	M	M	S	M	S	S	S	M
CO 4	S	S	S	S	M	M	S	M	S	S	M	M
CO 5	S	S	S	S	M	M	S	S	S	S	S	S

S - Strong, M - Medium, L - Low

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Sem.	Course Code	Core II: Chemistry of Biomolecules	Total Marks: 100		Hours / Week	Credits
I	21UAPCT102		CIA: 50	ESE: 50	4	4

Course Objectives:

1. To learn about the chemistry and structures of biomolecules
2. To know the properties of different biomolecules
3. To understand the physiological functions of biomolecules

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

CO 1	Relate the classifications of various Biomolecules	K1 - K4
CO 2	Illustrate the structure of carbohydrates, lipids, amino acids and nucleic acids	
CO 3	Compare and Contrast the features of various Biological molecules	
CO 4	Interpret the biological importance of carbohydrates, lipids, amino acids, proteins, nucleic acids, vitamins and minerals	
CO 5	Analyze the properties and applications of complex Biomolecules	

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

Unit - I Carbohydrates

Definition, Classification and Functions of Carbohydrates. Isomerization - Stereoisomerism and Optical isomerism of sugars, Cyclic structure, Epimers, Anomers and Mutarotation.

Monosaccharides: Structure, Properties and Functions of Glucose and Fructose.

Disaccharides: Structure, Occurrence and Functions of Sucrose, Lactose and Maltose.

Polysaccharides: Structure, Occurrence and Functions of Starch, Glycogen, Cellulose, Chitin, Inulin, Hyaluronic acid, Chondroitin sulfate and Heparin.

Artificial sweeteners: Structure, Properties and Uses of Saccharin and Aspartame.

Unit - II Lipids

Definition, Classification and Biological role of lipids

Simple lipids: Properties and Characterization of fats – Hydrolysis, Saponification, Halogenation, Acetyl number, Rancidity of fats, Reichert-Meissel number.

Compound lipids: Structure and Functions of Phospholipids and Glycolipids.

Derived lipids: Classification, Structure and Properties of Saturated and Unsaturated fatty acids; Difference between Essential and Non-essential fatty acids.

Plant sterol: Structure and Functions of Ergosterol and Stigmasterol;

Animal sterol: Structure and biological significance of cholesterol.

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Unit - III	Amino Acids and Proteins

Amino acids: Definition, Amino acids as ampholytes, Classification of amino acids based on chemical nature, Chemical reaction of amino acids due to carbonyl and amino groups. Importance of Essential and Non-essential amino acids.

Peptide bond: Structure and significance of peptide bond, Identification of N (Sanger's and Edman degradation method) and C (Hydrazinolysis) terminal residues.

Protein structure: Levels of structure in Protein Architecture - Primary structure (Insulin), Secondary structure (Keratin), Tertiary structure (Myoglobin) and Quaternary Structure (Hemoglobin). Forces stabilizing the structure of proteins

Unit - IV	Nucleic acids

Nucleic acids: Structure of Purines and Pyrimidines; Nucleosides and Nucleotides.

DNA: Watson Crick model of DNA - Chargaff's rule, Characteristic features of DNA; Forms of DNA, Properties of DNA - Denaturation and Renaturation.

RNA: Structure and functions of mRNA, tRNA and rRNA.

Karyotyping: Principle and Applications of Karyotyping.

Unit - V	Vitamins and Minerals

Vitamins: Definition, Classification, Sources, Biological importance and Deficiency symptoms of Fat soluble vitamins and Water soluble vitamins

Minerals: Definition, Classification, Sources, Functions and Deficiency symptoms of Macro minerals (Na, K, Ca, P, Mg, S and Cl) and Micro minerals (Fe, Zn, Mn, I, Cu, Mo and F).

Natural pigments: Biological significance of Chlorophyll, Carotenoids and Anthocyanin.

Skill Development Activities	Max. Marks (10)
Assignment	3
Quiz	3
Model Preparation	3
Punctuality	1

TEXT BOOKS

1. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Wolters Kluwer (Inidia) Pvt. Ltd, 8th Edition, 2016.
2. A.C. Deb, Fundamentals of Biochemistry, La Vergne : New Central Book Agency, 11th edition, 2020
3. J. L. Jain, Fundamentals of Biochemistry, 7th edition, S. Chand Publishing, 2016.
4. S. Nagini, Textbook of Biochemistry, Scitech Publications, 2nd Edition, 2007

REFERENCE BOOKS	
1	A.L. Lehninger, D.L. Nelson, M.M. Cox, M.M., Principles of Biochemistry, W.H.Freeman Publishers, 7th Edition, 2017.
2	Garrett & Grisham, Principles of Biochemistry, Saunders College Publishing, 4th Edition, 2010
3	Lubert stryer, Biochemistry, Freeman and company, 9th Edition, 2019
4	S.C. Rastogi, V.N. Sharma, Anuradha Tanden, Concepts in Molecular biology, 1st Edition, 2007

WEB RESOURCES	
1	https://epgp.inflibnet.ac.in/
2	https://byjus.com/neet/important-notes-of-biology-for-neet-biomolecules/

Course Designed By	Verified By	Approved By HOD
Mr. G. KARTHIKEYAN	Dr. N. SANGEETHA	Dr. A. K.VIDYA

QUESTION PAPER PATTERN

Time: 3 hours		Max. Marks: 50
SECTION-A (10 X 1 = 10 Marks) Answer ALL questions Choose the correct answer Two questions from each unit	**SECTION-B (5 X 3 = 15 Marks)** Answer ALL questions Either or type Two questions from each unit	**SECTION - C (5 X 5 = 25 Marks)** 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
CO 1	M	S	M	M	M	M	S	S	M	M	S	S
CO 2	S	S	M	M	M	M	S	S	M	M	S	S
CO 3	S	S	M	M	M	M	S	S	S	S	S	S
CO 4	S	S	M	M	M	M	S	S	S	S	S	S
CO 5	S	S	M	M	M	M	S	S	M	M	S	S

S - Strong, M - Medium, L - Low

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Sem.	Course Code	Allied I: Chemistry - I	Total Marks: 75		Hours / Week	Credits
I	21UAPAT103		CIA: 30	ESE: 45	4	3

Course Objectives:

- To understand the importance of Atomic structure and chemical bonding
- To know the basic concepts of isomerism and facts of solutions & 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.

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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. Racemization 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.

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 Arun Bahl, Advanced Organic Chemistry, S. Chand and Company Ltd, 1st Edition, 2017
3	B. S. Bahl, G. D. Tuli and Arun Bahl, 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.

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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	Dr. A. K.VIDYA

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 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
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	Core III: Professional English II	Total Marks: 100		Hours / Week	Credits
II	21UAPCT201		CIA: 50	ESE: 50	4	4

Course Objectives:

1. To develop the language skills of students
2. To enhance the lexical, grammatical and socio-linguistic and communicative competence
3. To focus on developing students' knowledge of 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	Demonstrate the language skills through academic writing	
CO 3	Apply the communicative skills by responding to given situations	
CO 4	Communicate leadership quality and team building	
CO 5	Analyze the information in various circumstances	

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.

Unit - III	Digital Competence

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.

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Unit - IV	Creativity and Imagination

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 & 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	Max. Marks (10)
Creation of a Mindmap	3
Interpreting a Interview by a Subject Expert	3
Reading and Summarizing a Subject related Research Article	3
Punctuality	1

	TEXT BOOKS
1	Professional English For Life Sciences II–TANSCHE
	REFERENCE BOOKS
1	A Handbook of English for Engineers and Technologists, BS Publications, Eliah P, 2003.
2	English for Professionals, Vayu Education of India, Dr.SheemaMiglani&ShikhaGoyal, 2010.
3	Business English, Tata McGraw-Hill Edition, Dona J.Young, 2012
	WEB RESOURCES
1	https://www.classcentral.com/course/swayam-business-english-communication-10097

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QUESTION PAPER PATTERN	
Time: 3 hours	**Max. Marks: 50**
SECTION-A (10 X 1 = 10 Marks) (Vocabulary) (MCQ, Info-gap questions –domain specific vocabulary)	**SECTION-B (4 X 10 = 40 Marks)** (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	M	M	S	M	S	S	S	S
CO 2	S	S	S	M	M	M	S	M	S	S	S	M
CO 3	S	S	S	S	M	M	S	M	S	S	S	M
CO 4	S	S	S	S	M	M	S	M	S	S	M	M
CO 5	S	S	S	S	M	M	S	S	S	S	S	S

S - Strong, M - Medium, L - Low

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Sem.	Course Code	Core IV: Tools and Techniques in Biochemistry	Total Marks: 100		Hours / Week	Credits
II	21UAPCT202		CIA: 50	ESE: 50	4	4

Course Objectives:

- The course will help students to acquaint with basic instrumentation, principle and procedure of various sophisticated instruments
- To get a comprehensive overview of the principles and applications of the instruments.
- This will enable the students to implement the use of these techniques in biological research and in discovering new products.

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

CO 1	Discuss the features of various biochemical tools	K1 - K4
CO 2	Distinguish the principles of different biochemical techniques	
CO 3	Determine the protocols involved in the techniques of chromatography, electrophoresis and centrifugation.	
CO 4	Focus the applications of analytical techniques and biomedical equipments	
CO 5	Memorize the working procedure of instruments used in biochemistry laboratory	

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

Unit - I pH Meter and Buffer Systems

pH meter: Principle, Types of Electrode - Glass Electrode, Reference Electrode; pH scale; Henderson-Hasselbalch equation.

Buffer: Buffer solutions, Buffer systems of Blood - Bicarbonate, Phosphate and Hemoglobin Buffer system.

Various ways of expressing and conversion of concentration of solutions: Molality, Molarity, Normality, Mole fraction, Percentage Solution (v/v, w/v). Simple problems to be worked out.

Unit - II Chromatography

Chromatography: Principle, Techniques and Applications of Paper, Thin layer, Ion-exchange, Affinity, Gel Permeation, Adsorption chromatography.

Principle, Instrumentation and Applications of GLC and HPLC.

Unit - III Electrophoresis and Centrifugation

Electrophoresis: Principle, Techniques and Applications of Agarose gel electrophoresis, SDS-PAGE, Isoelectric focusing, Immunoelectrophoresis.

Centrifugation: Basic Principle, Types of centrifuge - Bench top, High speed.

Ultra centrifuge: Preparative Centrifugation - Differential and Density Gradient for Separation of Cell Organelles. Analytical Centrifugation - Principle, Instrumentation and Applications. Determination of Molecular weight by Sedimentation velocity method

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Unit - IV	Spectrophotometer and Biomedical Instruments

Spectrophotometer: Beer Lambert's Law, Types - Difference between Single beam and Double beam spectrophotometer. Principle, Instrumentation and Applications of Colorimeter, UV and Visible Spectrophotometer, Fluorimeter and Flame photometry.

Biomedical Instruments: Principle and Applications of ECG, EEG, CT Scan, Doppler, MRI Scan.

Unit - V	Tracer Techniques and Immunochemical techniques

Tracer Techniques: Radio isotopes - Penetrating ability, Types of Radioactive decay, Units of Radioactivity.

Detection and Measurement of Radioactivity: Principle, Techniques and Applications of GM counter, Scintillation counter, Autoradiography. Applications of Radio isotopes.

Immunochemical techniques: Principle, Technique and Applications of Radio Immuno Assay (RIA) and Fluorescent Immuno Assay (FIA).

Skill Development Activities	Max. Marks (10)
Assignment	3
Quiz	3
Group Discussion	3
Punctuality	1

	TEXT BOOKS
1	B. K. Sharma, Instrumental method of chemical analysis, Krishna Prakashan Media (P) Ltd., 1st edition, 2014
2	Dr. M. Arumugam, Biomedical Instrumentation, Anuradha Agencies, 2002
3	A. Upadhyay, K. Upadhyay and N. Nath, Biophysical Chemistry - Principles and Techniques, Himalaya Publishing House Pvt. Ltd, 4th Edition, 2016
	REFERENCE BOOKS
1	Kudesia V.P. Sawhaney H, Instrumental method of chemical analysis, 1989
2	Plummer, D. T, An Introduction to Practical Biochemistry, McGraw Hill Education, 3rd Edition, 2001
3	Keith Wilson and John Walker, Practical Biochemistry, Principles and Techniques, Cambridge University Press, 2nd Edition, 2000
4	Mohammad Rafiq, Asima Hamid, Gulzar Ahmad, Analytical Biochemistry, Book Enclave, 1st Edition, 2019

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WEB RESOURCES	
1	https://epgp.inflibnet.ac.in/
2	https://www.biologydiscussion.com/biochemistry/top-6-tools-of-biochemistry-their-principles-and-applications/11135
3	http://ecoursesonline.iasri.res.in/course/view.php?id=282

Course Designed By	Verified By	Approved By HOD
Mr. G. KARTHIKEYAN	Mrs. T. RADHA	Dr. A. K.VIDYA

QUESTION PAPER PATTERN

Time: 3 hours		Max. Marks: 50
SECTION-A (10 X 1 = 10 Marks) Answer ALL questions Choose the correct answer Two questions from each unit	SECTION-B (5 X 3 = 15 Marks) Answer ALL questions Either or type Two questions from each unit	SECTION - C (5 X 5 = 25 Marks) 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
CO 1	M	S	M	M	M	S	S	S	M	M	S	S
CO 2	M	S	M	M	M	S	S	S	M	S	S	S
CO 3	S	M	M	M	S	S	S	S	M	S	S	S
CO 4	S	M	M	M	S	S	S	S	S	S	S	S
CO 5	S	M	M	M	S	S	S	S	M	M	S	S

S - Strong, M - Medium, L - Low

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS) ERODE 638 107

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Sem.	Course Code	Core Biochemistry Practicals - I	Total Marks: 75		Hours / Week	Credits
I & II	21UAPCP203		CIA: 30	ESE: 45	2	3

(Examination at the end of Second Semester)

Course Objectives:

- To enable the students to learn the basic biochemical calculations
- To enable the students to learn the qualitative analysis procedures of Biomolecules
- To enable the students to know the techniques of pH meter and Separation procedures

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

CO 1	Exhibit Knowledge on Biochemical calculations	K1 – K5
CO 2	Develop laboratory skills required for qualitative analysis of Carbohydrates	
CO 3	Get practical exposure with identification of Amino acids	
CO 4	Acquire practical knowledge on qualitative analysis of Lipids	
CO 5	Learn the techniques of pH measurement and chromatography for buffer preparation and separation of samples respectively	

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

Unit - I **Biochemical Calculations**

Preparation of Molar solutions, Normal solutions and Percentage solutions [v/v, w/v].

Unit - II **Qualitative Analysis of Carbohydrates**

a) Monosaccharides - Glucose, Fructose, Xylose,
b) Disaccharides - Sucrose, Maltose and Lactose.
c) Polysaccharides - Starch and Dextrin.

Unit - III **Qualitative Analysis of Proteins and Amino acids**

i) Proteins - Precipitation reactions of proteins, Colour reactions of proteins

ii) Amino acids

a) Histidine b) Tyrosine c) Tryptophan
d) Methionine e) Cysteine f) Arginine

Unit - IV **Qualitative Analysis of Lipids**

a) Solubility test b) Iodine test c) Test for free fatty acids
d) Emulsification test e) Saponification test f) Test for glycerol

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Unit - V	Group and Demonstration Experiments

Group Experiments - Preparation of buffer and its pH measurements using pH meter.

Demonstration Experiment

Separation of Amino acids by Paper Chromatography

Separation of Lipids by Thin Layer Chromatography

TEXT BOOKS

1	David T Plummer. An Introduction to Practical Biochemistry, McGraw-Hill Book Company (UK) Ltd., London, 3rd edition, 1987.
2	Pattabiraman, Laboratory Manual in Biochemistry, ASM publications, 1987.
3	NPTEL Online Course on Experimental Biochemistry
4	S. Shanmugam, T. Sathish Kumar, K. Panner Selvam, Laboratory Handbook on Biochemistry, Published by Asoke K. Ghose PHI Learning Private Ltd, 2010.
5	Beedu Sashidhar Rao, Vijay Deshpande, Experimental Biochemistry, I.K.International Private Ltd., 2005

REFERENCE BOOKS

1	J.Jayaraman, Practical Biochemistry, New Age International, 2001
2	S. Sadasivsam, A. Manickam, Biochemical methods, New Age International publishers, 3rd Edition, 2016

WEB RESOURCES

1	http://biotech01.vlabs.ac.in/
2	https://biocyclopedia.com/index/biotechnology_methods/biochemistry/qualitative_tests.php

Course Designed By	Verified By	Approved By HOD
Dr. N. SANGEETHA	Mr. R. RASU	Dr. A. K.VIDYA

QUESTION PAPER PATTERN

Carbohydrates	Amino acids / Proteins / Lipids	Procedure (for 2 Experiments)	Viva Voce	Record
15	10	10	05	05

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Sem.	Course Code	Allied Practicals - I Chemistry	Total Marks: 50		Hours / Week	Credits
I & II	21UAPAP205		CIA: 25	ESE: 25	2	2

(Examination at the end of Second Semester)

Course Objectives:

- To understand the principles of volumetric analysis.
- To analyse the hardness of water from different sources
- 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 BOOKS

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

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REFERENCE BOOKS	
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_Qrganic_Qualitative_Analysis

Course Designed By	Verified By	Approved By HOD
Mr. S. NATARAJAN	Mr. R. RASU	Dr. A.K.VIDYA

QUESTION PAPER PATTERN

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)

ERODE – 638 107

ACTIVITIES

SINCE 1994

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE
DBT STAR COLLEGE SCHEME
BIOCHEMISTRY, BIOTECHNOLOGY, MATHEMATICS, PHYSICS, COSTUME DESIGN AND FASHION & PSYCOLOGY

Student's Induction Programme
Topic - WEBINAR ON "BE A CHAMPION..!"
(13.09.2021)

REPORT

A **webinar** on **"Be a Champion..!, "** was organized for I UG Students of Departments of Biochemistry, Biotechnology, Mathematics, Physics, Costume Design and Fashion & Psychology by DBT STAR Departments as part of Student's Induction programme on 13/09/2021 to motivate the student minds. The meeting platform was zoom and it was live streamed on You tube Special address was given by **Ms.Meera Natarajan, Educator, Mentor and NLP Trainer, Founder-Success Programming, Pune** and 300 students from the above departments participated in this webinar.

The Chief Guest gave an enthralling Speech and motivated students to shine in their life with 100% Dedication and Hardwork.She revealed new ideas and tips as pointers for being a star and smart student. She also insisted students to knock big doors and be a lifelong learner. She also encouraged the students interaction and made them to enjoy and learn from her session. She explained how to achieve success and be a champion. She suggested books like (THE POWER OF SUBCONCIOUS MIND, THE MONK WHO SOLD HIS FERRARI, THE MAGIC OF THINKING BIG) to students to enrich their young minds with positive thoughts.

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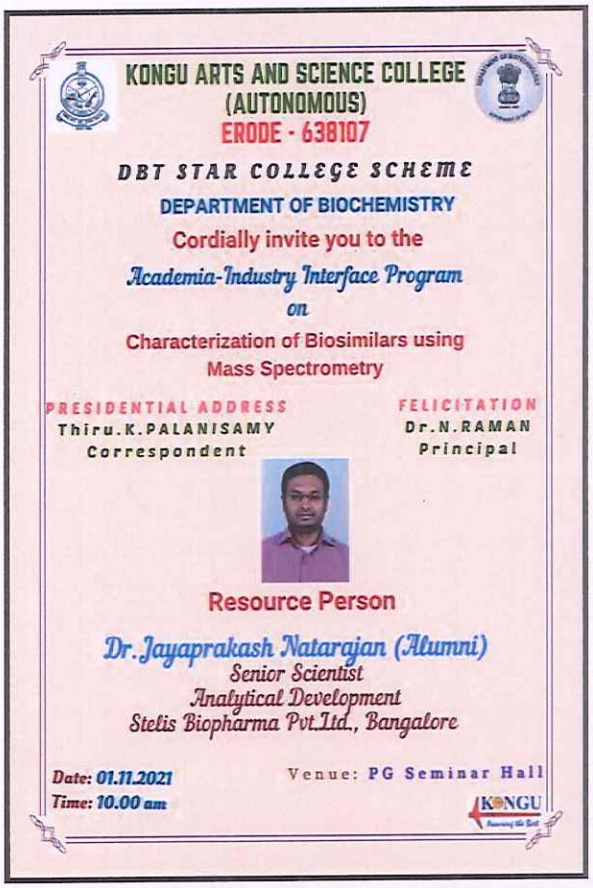
KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF BIOCHEMISTRY

DBT STAR COLLEGE SCHEME

Academic Industry interface program on
"Characterization of Biosimilars using Mass Spectrometry"
(01.11.2021)

REPORT



An Academic Industry interface program on **"Characterization of Biosimilars using Mass Spectrometry"** was organized for Students of Biochemistry Department under DBT Star College Scheme on 01/11/2021 in PG Seminar Hall.Special address was given by **Dr.Jayaprakash Natarajan (Alumni),** Senior Scientist,Analytical Development,Stelis Biopharma Pvt Ltd.,Bangalore. 140 students participated in this Guest Lecture.

In his presentation, Dr.Jayaprakash enlighted the students about biopharma medicines and explained how it differs from synthetic medicine.He insisted students to be updated on recents trends in biological field and explained clearly about new techniques and equipment's used in biopharma industries.This helped students to understand the working mechanism of several equipments.He motivated the students to read journals related to their field of interest. After the lecture he also had interaction with students in the classroom and cleared all their doubts and shared ideas to fit themselves in biopharma Industry.

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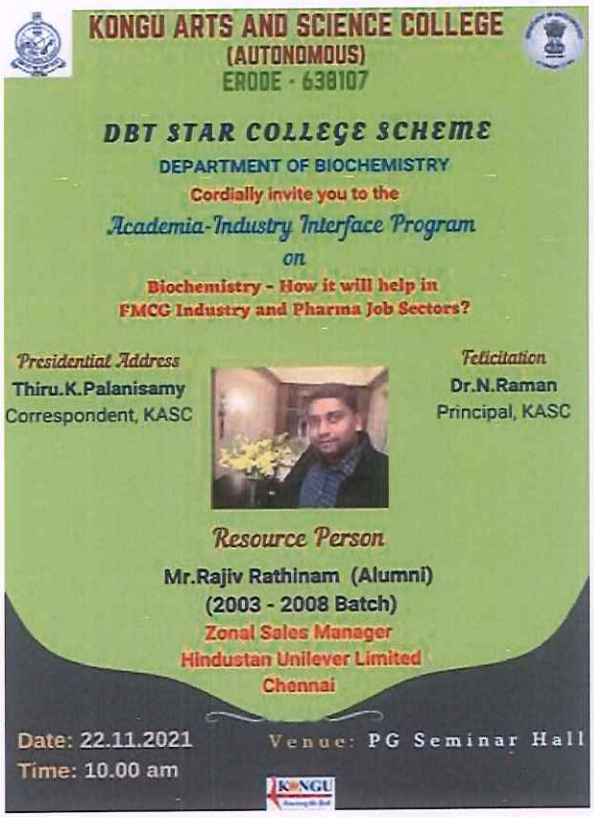
DEPARTMENT OF BIOCHEMISTRY

DBT STAR COLLEGE SCHEME

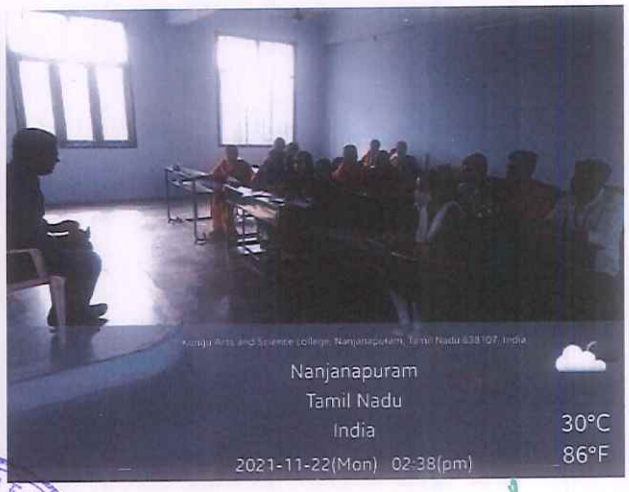
Academic Industry interface program on
"Biochemistry- How it will help in FMCG industry and Pharma job sectors"
(22.11.2021)

REPORT



An Academic Industry interface program on "**Biochemistry- How it will help in FMCG industry and Pharma job sectors**" was organized by Biochemistry Department for Students of Biochemistry and MBA Departments under DBT Star College Scheme on 22/11/2021 in PG Seminar Hall. Our Alumni **Mr. Rajiv Rathinam, (2003-2008 Batch), Zonal manager,Hindustan Unilever Limited, Chennai** was the resource person.168 students participated in this Guest Lecture.

Mr. Rajiv Rathinam Started his session with motivational talk and discussed how to analyze the purpose of life and career. He requested students to set short and long term goals that would drive them towards success. Later he shared more informations regarding fast moving consumable goods. He also mentioned that communication, Interpersonal, Analytical (knowledge in MS word and Excel), and Negotiation were the basic skills required to fit in FMCG Industry. He gave a detailed account on working mechanism of several sectors in FMCG industries like Beauty and personal care, Food and refreshment, Home care and discussed job opportunities for biochemist in Production, Quality control and Management. He drew an career map for business startups. As a former scientist in several biopharma industries, he gave brief informations regarding diabetes and its prevention and treatment through life style and medicines. He also had interaction with students in the classroom after the program and clarified all their doubts regarding job opportunities in FMCG industry and Biopharma Industry.



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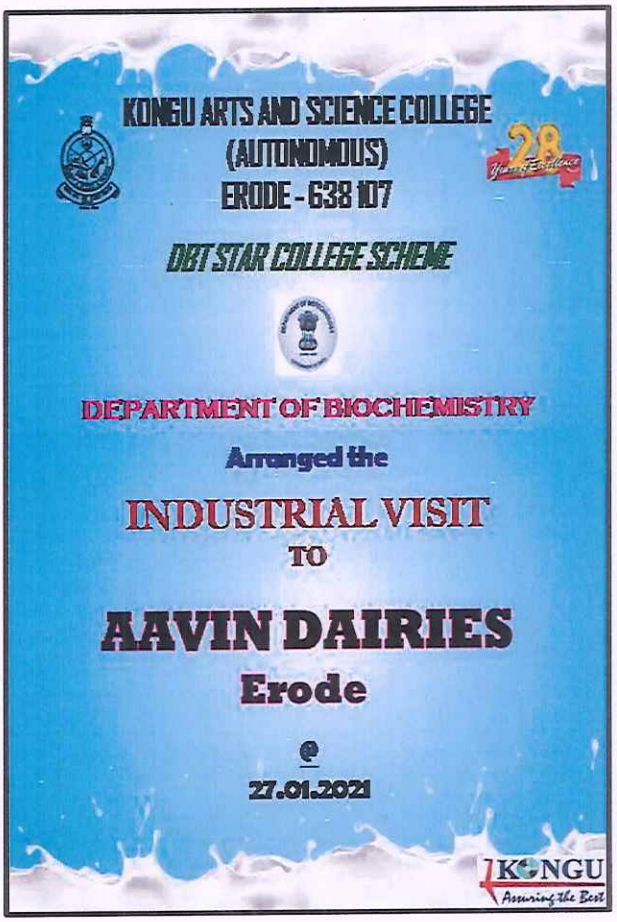
DEPARTMENT OF BIOCHEMISTRY

DBT STAR COLLEGE SCHEME

INDUSTRIAL VISIT TO AAVIN DAIRIES (18.11.2021)

REPORT



Department of Biochemistry of Kongu Arts and Science College, Erode organized an **Industrial visit** for II UG and II PG students to **Aavin Dairies**, Chithode, Erode under DBT Star College Scheme and 51 students were beneficiaries.

In this visit they learnt about the biochemical analysis and Estimation of milk contents in the Quality Control Section. They understood the difference between Heating and steaming in the production of milk products. It paved way for the students to get an idea about milk powder preparation and estimation of moisture content after preparing the preparation.

This visit helped them to learn about the preparation of skimmed and non-skimmed milk and other products such as ghee, butter, yoghurt and the working mechanism of silo tanks, tum tanks and their uses, as well as methods for estimating fat and moisture in milk. It was an opportunity for the students to learn about the role of the Biochemistry in the production of Dairy products and the employment opportunities in it.

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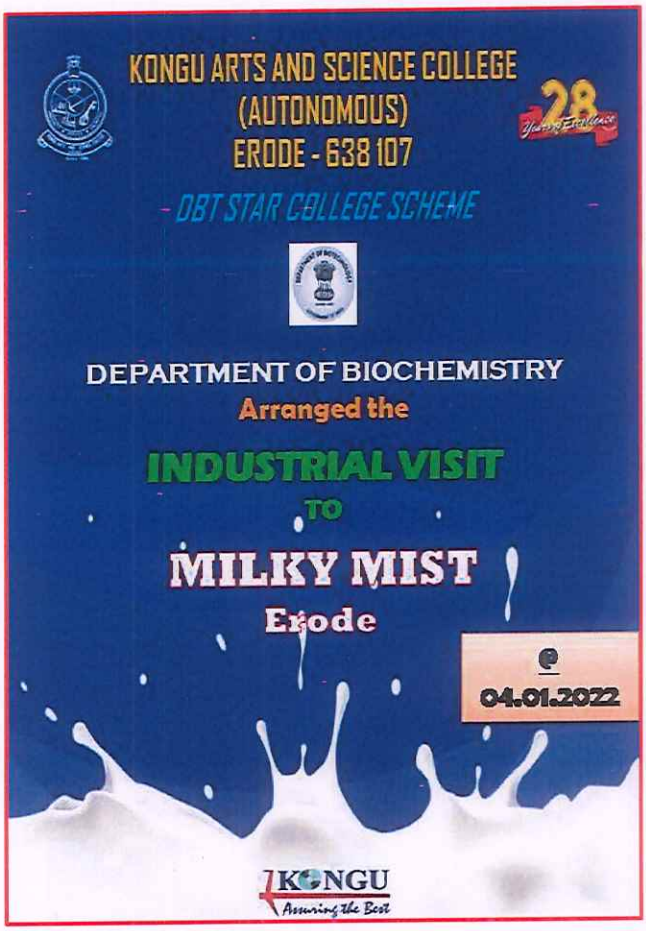
KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF BIOCHEMISTRY

DBT STAR COLLEGE SCHEME

INDUSTRIAL VISIT TO MILKY MIST
(04.01.2022)

REPORT



Department of Biochemistry of Kongu Arts and Science College, Erode organized an **Industrial visit** for III UG and II PG students (60 Students) to **Milky Mist**, Perundurai, Erode under DBT Star College Scheme.

In this visit, the Students learnt about the Biochemical analysis and estimation of Milk contents in the Quality Control Section. They understood the concepts behind the production of Paneer, Curd, sweet curd, Ghee, Cheese and its packing techniques.

This visit helped them to learn about the preparation of production tank, precautions to be done before production and importance of quality check before marketing. It was an opportunity for the students to learn about the role of the Biochemistry in the production of Dairy products especially the Value Added Products from Milk and the employment opportunities in it. The Establishment history of Milky Mist also motivated students to convert their ideas into action and enlightened their entrepreneual mind.

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