KONGU ARTS AND SCIENCE COLLEGE

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

ERODE – 638 107

PROGRAM NAME

B.Sc. (Biochemistry)

KONGU ARTS AND SCIENCE COLLEGE

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

ERODE – 638 107

2018-2019

KONGU ARTS AND SCIENCE COLLEGE

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SYLLABUS

Sem.	Course Code	ALLIED III – BIOMATHEMATICS	Total Marks: 75		Hours Per Week	Credits
III	17UAPCT303		CIA: 20	ESE: 55	4	3

Objective(s):

To enable the students to understand the concepts of Mathematical and Statistical results and to develop sufficient knowledge to apply in their further studies.

Course Outcome:

On successful completion of the course, the students will be able to

CO1 - Apply the concepts of binomial and exponential theorems in summation of series.

CO2 - Solve the problems using Matrices.

CO3 - Describe different types, collection and presentation of data.

CO4 - Determine the measures of central tendency and dispersion.

CO5 - Apply Correlation and Regression in statistical analysis.

UNIT I

Binomial and Exponential theorems (Statement only) -Application to summation of series – Simple Problems.

UNIT II

Matrices – Types of Matrix – Operations – Matrix Multiplication - Inverse of a matrix- Rank of Matrix –Linear Equations by Matrix method – Simple Problems.

UNIT III

Statistics: Meaning and Scope- -Collection of Data-Primary and Secondary data - Methods of collecting Primary and Secondary Data-Classification and Tabulation- Presentation of data by Diagrams-Bar diagram and Pie diagram - Graphic Representation of Frequency Distribution.

UNIT IV

Measures of Central Tendency: Mean, Median and Mode - Geometric Mean and Harmonic Mean (simple problems only).

Measures of Dispersion: Range, Quartile Deviation, Standard Deviation and Co-efficient of Variation.

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UNIT V

Correlation: Meaning–Scatter Diagram-Karl Pearson's Co-efficient of Correlation- Spearman's Rank Correlation.

Regression Analysis: Meaning of Regression–Regression in Two Variables- Difference between Correlation and Regression.

Text Books:

1. P.Kandasamy and K.Thilagavathi, "Allied Mathematics", Paper- I First Semester , S.Chand and Company Ltd, New Delhi, 2003.

   UNIT I: Pages 8-27

   UNIT II: Pages 72-106

2. P.A Navnitham, "Business Mathematics & Statistics", Jai Publishers, Trichy, 2011.

   UNIT III Chapter 1, 3, 5, 6: Pages 1 – 5, 9-17, 28-39,61-64, 83-91, 99-119, 131-146

   UNIT IV Chapter 7, 8: Pages 159- 183, 196-209, 212-227, 251-260, 301 -310, 325-340

   UNIT V Chapter 12, 13: Pages 503-508, 518-522, 540-554, 563-569

Reference Books :

1. R.S.N.Pillai and Bagavathi, "Statistics theory and practice", Jai Publishers, Trichy 21, 2013.
2. P.R.Vittal, "Allied Mathematics", Margam Publications, Chennai, 2002.
3. Jerrold H.Zar, "Biostatistical Analysis", Pearson Education, 4th Edition, 1999.
4. S.Prasad, "Elements of Biostatistics", Rastogi publications, Meerut, 2005.
5. P.Raja, " Mathematics and Biostatistics", Subash Publications, 1999.

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QUESTION PAPER PATTERN		
SECTION - A	**SECTION - B**	**SECTION - C**
10 x 1 = 10 Marks (Multiple Choice, Four options) Two questions from each unit	**5 x 3 = 15 Marks** (Either or choice) Two questions from each unit	**3 x 10 = 30 Marks** (Answer any three Questions) One Question from each unit

HEAD OF THE DEPARTMENT
DEPARTMENT OF BIOCHEMISTRY
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Sem.	Course Code	SKILL BASED COURSE I – NUTRITIONAL BIOCHEMISTRY	Total Marks: 75		Hours Per Week	Credits
IV	17UAPST304		CIA: 20	ESE: 55	3	3

Objective(s):

- To acquire knowledge of various concepts of nutrition – facts and principles
- To inculcate students for healthy attitudes
- Update knowledge about essential nutrients

Course Outcome:

At the end of the course the students will be able to

CO1 - Acquire detailed knowledge regarding the biological basis of nutrition.

CO2 - Develop laboratory skills required for a modern biochemical study of nutrition includes the quantitative analysis and interpretation of results.

CO3 - Attain the mechanisms by which diet can influence our health.

CO4 - Integrate biochemical mechanisms with disease pathology and clinical treatment options.

CO5 - Gain the principles, knowledge and application of integrative nutrition in the areas of whole foods & food as a medicine.

UNIT – I

Nutrient and Health – Definition of Food and Nutrition. Classification of Food groups: Nutritional importance of Carbohydrates, Fibers, Proteins and Fats. Source and Functions of Vitamins and Minerals – An overview.

Water: Distribution of water in body, Factors influencing distribution, Physiological functions of water.

Electrolytes: Sodium, Potassium and Chloride. Acid - Base Balance and its regulation in human body.

UNIT – II

Energy: Definition of Energy, Kilocalories, Joule, Biological value, NPU, Digestibility coefficient, PER, RDA, Balanced diet.

Calorific Value of foods. Thermogenic effects (SDA) of food.

BMR – Definition, measurement and factors affecting BMR.

UNIT – III

Functional foods

Probiotics – Definition, Types, Mechanism of Action, Applications and Commercial Probiotics.

Prebiotics - Definition, Sources and Functions.

Diet Therapy

Therapeutic diets for Anemia, Cardiovascular diseases, Diabetes Mellitus, Cancer.

UNIT – IV

Diet and Disease

Disorders related to nutrition: Protein Malnutrition, Obesity, Starvation.

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Nutritional disorders of the Nervous system: Burning feet syndrome, Spinal ataxia.
Nutritional disorders of Skin: Follicular hyperkeratosis, Xerodermia.
Nutritional disorders of Eye: Night Blindness, Bitot's Spot.
Nutritional disorders of Mouth: Nutritional glossitis, Parotid gland enlargement.

UNIT – V

Naturally occurring Antioxidants: Walnuts, Broccoli, Tomatoes.
Naturally occurring Antinutrients.
Nutrient loss: Loss of nutrients during processing and cooking.
Food Allergy: Definition, Food as Allergens – Types, Symptoms, Diagnosis and Treatment.
Toxicants in foods: Natural occurring toxicants – Toxicants from pathogenic Microorganisms – Contamination of foods with toxic chemicals and pesticides.

Text Books:

1. Fundamentals of Biochemistry – A.C. Deb, New Central Book Agency Pvt Ltd, VII Edition, 2000.
2. Nutritional Biochemistry, Tom Brody, Elsevier Publishers, 1999.
3. Biochemistry, Satyanaryana.U, Books and Allied (P) Ltd, India, 1995.

Reference Books:

1. William's Basic Nutrition and Diet Therapy – Staci Nix – XII Edition, Elsevier Publishers, 2005.
2. Krauses Food, Nutrition and Diet Therapy, Mahan L. K, Stump S.E, 2004, Elsevier (USA).
3. Diabetes, B. Srilakshmi, New Age International (P) Limited Publishers, V Edition, 2005.
4. Nutritional Biochemistry, S.Ramakrishnan, S.Venkat Rao, T.R.Publications, I Edition, 1995.
5. Nutrition and Metabolism, Edited by Gibney, Macdonald & Rock, Blackwell Publishing, 2004.

QUESTION PAPER PATTERN		
SECTION - A	**SECTION - B**	**SECTION - C**
10 x 1 = 10 Marks (Multiple Choice, Four options) Two questions from each unit	**5 x 3 = 15 Marks** (Either or choice) Two questions from each unit	**3 x 10 = 30 Marks** (Answer any three Questions) One Question from each unit

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Sem.	Course Code	NON MAJOR ELECTIVE – I PUBLIC HEALTH AND HYGEINE	Total Marks: 100		Hours Per Week	Credits
IV	17UAPNT305		CIA: -	ESE: 75	2	2

Objective(s):

- To learn basic aspects of personal hygiene and its importance.
- To acquire knowledge of Communicable diseases, mode of transmission and treatment.
- To understand the impact of life styles in association with health.

Course Outcomes:

At the end of the course the students will be able to

CO1 - Develop basic knowledge on health and personal hygiene.
CO2 - Understand the role of nutrients for good health.
CO3 - Explain the mode of transmission and dietary planning for communicable diseases.
CO4 - Understand the food behavioral changes due to modernization and areas of fitness.
CO5 - Exhibit knowledge on circadian rhythm and occupational stress.

UNIT - I

Health and Hygiene - Definition of Health and factors affecting it- Food Habits, Cleanliness, Exercise and Sleep.

Personal Health – Basic aspects of Personal hygiene (Cleanliness of body, Care of Skin, Nail, Eye, Hair, Oral Health, Clothing.

Water – Importance of water, Impurities present in water, Sources of contamination of water and water purification (Household and natural methods)

UNIT - II

Introduction to Nutrition – Definition, General Introduction, Classification of Nutrients, Functions of Food, Social Function of Food, Psychological functions of Food. Fruits and Vegetables for Good health.

Energy – Definition of Kilocalories, Joule, Energy value of foods, SDA of Foods. Basal Metabolic Rate (BMR), Role of dietary fibre and health.

UNIT - III

Public Health: Communicable diseases, Mode of disease transmission (Epidemic and endemic diseases), Vaccination, Management of Hygiene in Public places (Biotoilets - Railway stations, Bus stands and other public places) Hospitals – Hospital acquired infections and hygiene in Educational institutions. Immunity - Definition, types of immunity and immunization schedule.

First Aid - Management of medical emergencies.

UNIT - IV

Life Style changes – Urbanization, Westernization, Food behavior changes, Alcohol Consumption, Smoking, Drug addiction. Importance of avoiding smoking, alcoholism, drugs etc

Role of advertisements in food patterns.

Physical Fitness - Importance of Physical Fitness, Role of Gymnastic Exercises and Yoga in improving health.

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UNIT - V

Occupational Health and Safety: Occupational health and hazards –Physical, Chemical and Biological hazards. Occupational diseases – Prevention and control. Health Protection measures for workers –Health Education; Circadian Rhythm – The Human biological Clock – Diorders of Circadian Timing.

Health Insurance Schemes - Government & Non Government Insurance Schemes.

Text Books:

1. Park K. "Textbook of Preventive & Social Medicine" 22ndedition, Banarsidas Bhanot publishers, 2013.
2. Roger Detels, Robert Beaglehole,Mary Ann Lansang, Martin Gulliford., "Oxford Textbook of Public Health", 5th edition. Oxford press, 2011

Reference Books:

1. Yash pal Bedi (1976) Hygiene & Public Health. Anand Publishing Co., gali No. 1, Nawan Kot Amritsar.
2. V. N. Hhave, (1975) You & Your Health.. National Book Trust
3. Bihari Lal Bhatia, (1961) Elementary.. Hygiene, Orient Longmans, Ltd. Calcutta
4. J.E. Park, (1983) Prenentive & Social Medicine, Jabalpur Messrs Banarcidas Bhanot
5. Birendra Nath Ghosh, (1969) Hygiene & Public Health Calcutta Scientific Publishing Co.

QUESTION PAPER PATTERN
SECTION - A
5 X 15 = 75 MARKS (Either or Choice) Two questions from each unit

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Sem.	Course Code	PRACTICAL II - CORE BIOCHEMSTRY PRACTICALS II	Total Marks: 75		Hours Per Week	Credits
III & IV	17UAPCP402		CIA: 30	ESE: 45	3	3

Objective(s):

- To understand and get familiarized with the quantification techniques.

Course Outcome:

At the end of the course the students will be able to

CO1 - Gain the fundamental knowledge of working with colorimeter and interpretation.
CO2 - Able to estimate the substance using titrimetric assays.
CO3 - Get familiarized with the assay of enzymes.
CO4 - Acquire practical exposure with chromatographic techniques.
CO5 - Get practical exposure with electrophoretic techniques

I. Colorimetry

1. Estimation of Glucose by O-Toluidine method
2. Estimation of Phosphorus by Fiske-Subbarow method
3. Estimation of Urea by DAM-TSC method
4. Estimation of Uric acid by Caraway method
5. Estimation of Iron by Wong's method
6. Estimation of Protein by Bradford's method
7. Estimation of Creatinine by Picric acid method
8. Estimation of RNA by Orcinol method
9. Estimation of DNA by Diphenylamine method

II. Titrimetry

1. Estimation of Calcium in Milk
2. Estimation of Chloride – Vanslyke's method
3. Estimation of Reducing sugar by Benedict's method

III. Enzymes (Group Experiment)

1. Assay of Salivary Amylase activity
2. Assay of Lipase activity

IV. Separation Techniques (Demonstration)

1. Column Chromatography
2. Separation of Serum Protein by Paper Electrophoresis
3. Isolation of Lecithin from Egg Yolk

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Sem.	Course Code	SKILL BASED COURSE – II: NANOTECHNOLOGY AND CLINICAL TRIALS	Total Marks: 75		Hours Per Week	Credits
IV	17UAPST405		CIA: 20	ESE: 55	3	3

Objective(s):

- To understand and get familiarized with the fundamentals of Nanotechnology
- To give a general introduction to different classes of nanomaterials and impart basic knowledge on characterization techniques involved in Nanotechnology
- To make the learner familiarize with the applications of nanotechnology in various fields
- To identify key operational requirements, data management and regulatory affairs in clinical trials

Course Outcomes:

At the end of the course the students will be able to

CO1 - Gain the fundamentals of Nanotechnology and to get knowledge familiarize with the new concepts of Nanoscience and Technology.

CO2 - Ability to manipulate matter at molecular scale and attain the principal classes of biomaterials and their functionalities in modern medical science.

CO3 - Impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology

CO4 - Acquire the outline interest of research about health care and study population.

CO5 - Attain general basics related to document development used in clinical trials.

UNIT – I

Nanotechnology: Introduction, Definition, Nanoscale.
Classification of nanomaterials – Based on Origin, Dimension and Structural configuration.
Applications: Nanotechnology in Medicine, Textile, Food and Agriculture.

UNIT – II

Properties of Nanostructured Materials: Size and Shape dependent properties – Colour, Optical properties, Electrical Conductivity, Magnetic properties, Thermal properties and Band Gap.
Nanomaterials: Quantum Dots, Nanowires, Carbon-based Nanomaterials (CNTs), Metal based nanomaterials – Nanogold and Nanosilver, Metal oxide Nanoshells – Zirconia and Silica Nanoshells.

UNIT – III

Synthesis of Nanomaterials: Top – Down (Ball Milling), Bottom – Up (Sol-Gel Processing), Green synthesis: Use of Bacteria, Fungi and Plants.
Characterization of Nanophase materials: XRD, SEM, TEM.

UNIT – IV

Research Design and Overview of Clinical Trials: Definition of Clinical Trial, Types of Clinical Trials, Planning and execution of Clinical trials - formulating research questions, Study population – Sample size determination.
Various Phases of Clinical trials: Phase-I, Phase-II, Phase-III and Phase-IV trials.

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UNIT – V

Documents in clinical study: Essential Documents in Clinical Trial - Investigator Brochure (IB), Case Report Form (CRF), Good Clinical Practice: ICH Guidelines, ICMR Guidelines.

Clinical Trial Applications: New Drug Application (NDA), Clinical Trial Applications in India.

Text Books:

1. Pradeep.T - Nano: The Essentials Understanding Nanoscience and Nanotechnology (2007), I Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi.
2. Lakshman Desai – Nanotechnology (2007), I Edition, Paragon International Publishers.
3. Manoroma 'Tell Me Why' – Nanotechnology – Technology that will shape the Future.

Reference Books:

1. Design and Analysis of Clinical Trials Concepts and Methodologies, Second Edition Shein-Chung Chow, Jen-Pei Liu, Wiley – Interscience, A John Wiley & Sons, Inc., Publication

QUESTION PAPER PATTERN		
SECTION - A	**SECTION - B**	**SECTION - C**
10 x 1 = 10 Marks (Multiple Choice, Four options) Two questions from each unit	**5 x 3 = 15 Marks** (Either or choice) Two questions from each unit	**3 x 10 = 30 Marks** (Answer any three Questions) One Question from each unit

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Sem.	Course Code	NON MAJOR ELECTIVE – II NUTRITION AND DIET THERAPY	Total Marks: 100		Hours Per Week	Credits
III	17UAPNT406		CIA: -	ESE: 75	2	2

Objective(s):

- To get aware of the purpose and principles of diet as therapy.
- To acquire knowledge of diet consumption during diseases and infections
- To learn the nutritional and dietary requirements for different age group

Course Outcomes:

At the end of the course the students will be able to

CO1 - Students will be able to acquire the basic concepts to Diet therapy.
CO2 - Develop basic idea of nutritional requirement during infections.
CO3 - Exhibit the knowledge about dietary requirements during liver and abdominal diseases.
CO4 - Explain the dietary habits for renal and heart patients.
CO5 - Understand the impact of diet on pregnancy and geriatric nutrition.

UNIT - I

Concept of Diet therapy: Introduction, Purpose and principles of therapeutic diets, classification of therapeutic diets. Modification of normal diet,
Etiology, clinical features and nutritional management of Weight Imbalances-Overweight and obesity; Underweight; Eating disorder- Anorexia nervosa and Bulimia.

UNIT - II

Diet in fever and microbial infections - Metabolism in fever, General dietary consideration diet in Influenza, Typhoid Fever, Recurrent Malaria and Tuberculosis.
Diet in surgical conditions, Burns and Cancer.

UNIT - III

Diet in diseases of the Liver, Gall Bladder and Pancreas:

- Liver – Jaundice, Hepatitis; Role of alcohol in liver diseases.
- Gall bladder – Gall bladder stones
- Pancreas – Diabetes Mellitus

Diet in Gastrointestinal diseases: Peptic Ulcer, Diarrhea, Constipation.

UNIT - IV

Diet in Renal diseases: Renal failure, Urinary calculi- Causes & treatment,
Diet in Cardiovascular diseases: Atherosclerosis, Hypertension, Myocardial infarction (Heart attack) and Coronary Heart Disease. Diet in Allergy and Skin disturbances.

UNIT - V

Diet in Pregnancy - Nutritional and food requirements in Pregnancy. Impact of nutritional deficiency on the outcome of Pregnancy. Diet during Labour and following Delivery
Geriatric Nutrition - Adult Nutrition. Food habits of Older People. Food requirements of Older People. Planning Meals for Older People.

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Text Books:

- Ruth.A.Roth. Nutrition and Diet Therapy, Tenth edition. Congage Learning, U.S.A.

Reference books:

- Mudambi, SR and Rajagopal, MV. Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Ed; 2007; New Age International Publishers
- Stacy Nix (2009). William's Basic Nutrition and Diet Therapy, 13th Edition. Elsevier Mosby.
- Mahan L K and Escott Stump S (2013). Krause's Food & Nutrition Therapy, 13th ed. Saunders-Elsevier.
- Seth V and Singh K (2007). Diet Planning through the Life Cycle Part II: Diet Therapy. A Practical Manual, 4th edition. Elite Publishing House Pvt. Ltd.
- Human Nutrition - B.Srilakshmi, New Age Publishers, 2nd edition (2008).

QUESTION PAPER PATTERN
SECTION - A
5 X 15 = 75 MARKS (Either or Choice) Two questions from each unit

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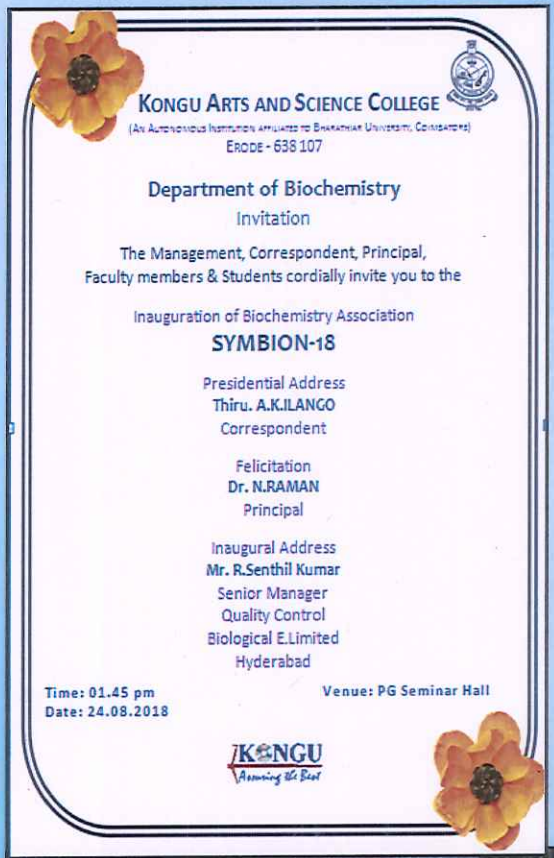
ACTIVITIES

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARMTENT OF BIOCHEMISTRY

SYMBION'18

REPORT



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Department of Biochemistry
Invitation

The Management, Correspondent, Principal,
Faculty members & Students cordially invite you to the

Inauguration of Biochemistry Association
SYMBION-18

Presidential Address
Thiru. A.K.ILANGO
Correspondent

Felicitation
Dr. N.RAMAN
Principal

Inaugural Address
Mr. R.Senthil Kumar
Senior Manager
Quality Control
Biological E.Limited
Hyderabad

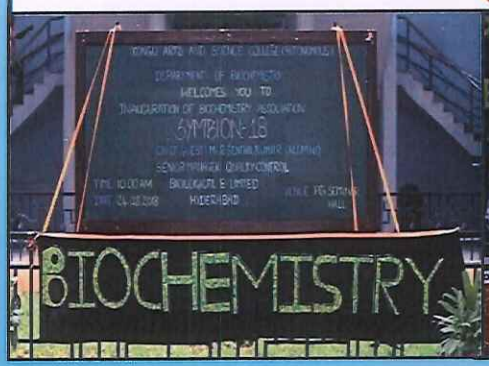
Time: 01.45 pm
Date: 24.08.2018

Venue: PG Seminar Hall

KONGU
Arming the Best

Biochemistry Association Inaugural Function - **SYMBION'18**was held on 24.08.2018 in PG Seminar Hall, Kongu arts and science college, Erode.

Mr. R. Senthil Kumar, Senior Manager, Quality Control, Biological E-limited, Hyderabad was the resource person of the day. The function inaugurated by the welcome address. The office bearers for the academic year 2018-2019 take their oath in the inauguration function. The function is then followed by prize distributions to students for their various participation and achievements. Chief Guest then addressed the gathering by a knowledgeable lecture on quality and output on an industry. Over 188 students were benefited by the wonderful session.



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Two-Day Lecture Workshop on **"Emerging Trends in Biochemistry"**

20.09.2018 - 21.09.2018

REPORT

Department of Biochemistry organized a Science Academies Sponsored **"Two-Day Lecture Workshop on Emerging Trends in Biochemistry"** in association with Indian Academy of Sciences (IASc), Bengaluru, Indian National Science Academy (INSA), New Delhi, and The National Academy of Sciences India on 20.09.2018 & 21.09.2018on UVS Hall, Kongu arts and science college, Erode

Dr. K. Veluthambi, FNA. FASc.FNASc.Convener, Lecture Workshop Professor (Retired)INSA Senior Scientist, School of Biotechnology, MaduraiKamarajUniversity, Madurai, **Prof. B. J. Rao**, Professor and Dean, Indian Institute of Science , Education and Research (IISER), Tirupati, **Dr. M. Raveendran**, Ph.D, Professor, Centre for Plant Molecular Biology (CPMB), Tamilnadu agricultural university, Coimbatore and **Dr. P. V. Shivaprasad**, Ph.D, National Centre for Biological Sciences tata institute of fundamental research (NCBS-TIFR), Bangalore were the chief guests for the two day function. Over 175 students and Research scholars were benefited on the discussion on recent trends and development in field of Biochemistry.

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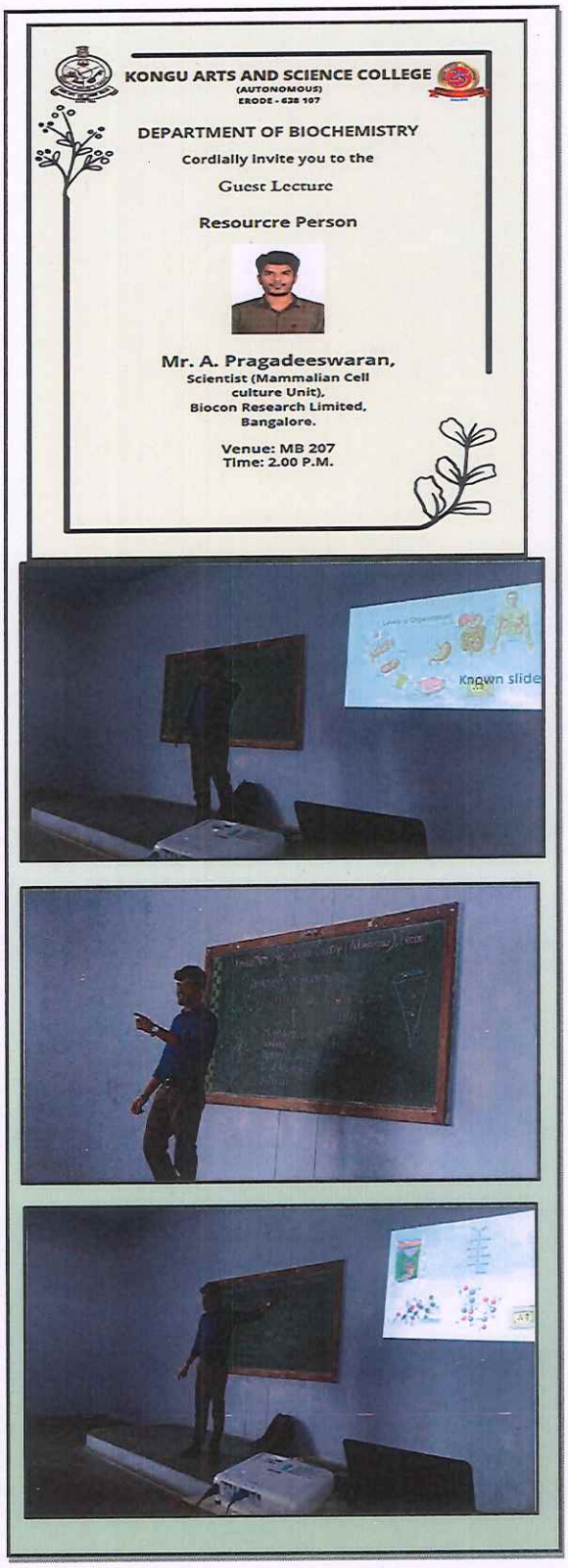
DEPARMTENT OF BIOCHEMISTRY

Guest Lecture

28.02.2019



REPORT

A **One day Guest Lecture** on **"Scope and Opportunities of Biochemistry"** was organized for Students of Biochemistry Department on 28.02.2019 in MB 207 hall. **Mr. A. Pragadeeswaran, Scientist (Mammalian Cell culture Unit), Biocon Research Limited, Bangalore** was the Resource Person. The Programme was attended by 90 Participants.

Mr.A.Pragadeeswaran made an interactive session with students.He took students from known to unknown and made the session more interesting.He shared his experience in Biocon Research Ltd., He revealed the role of Biochemist in Bioprocess Technology.He also provided various informations regarding Career opportunities and tips to face interviews.This session helped Students to gain knowledge as well as to gain self confidence and motivation.

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