



# **KONGU ARTS AND SCIENCE COLLEGE**

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

**ERODE – 638 107**

**B.Sc (Biochemistry)**



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**2018-2019**



KONGU ARTS AND SCIENCE COLLEGE, ERODE - 638 107

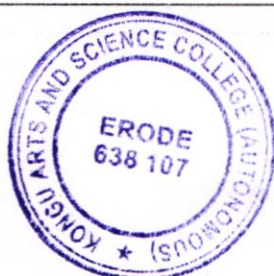
(AUTONOMOUS)


**B.Sc BIOCHEMISTRY**

(For the Candidates admitted during the Academic Year 2017 – 2018 and onwards)

**SCHEME OF EXAMINATION – CBCS PATTERN**

Part	Course Code	Course Title	Inst. Hrs /Week	T/P	Examination Details				Credits
					Duration in Hours.	CIA	ESE	Total Marks	
<b>SEMESTER I</b>									
I	17T01/17H01/ 17F01/17S01/ 17M01	Language - I	6	T	3	25	75	100	4
II	17E01	English - I	6	T	3	25	75	100	4
III	17UAPCT101	Core Paper I - Biomolecules	4	T	3	25	75	100	4
	17UAPCT102	Core Paper II - Cell Biology	4	T	3	25	75	100	3
	-	Core Biochemistry Practicals - I	2	P	-	-	-	-	-
	17UAPAT103	Allied I: Chemistry - I	4	T	3	20	55	75	3
	-	Allied Practicals I: Chemistry Practicals	2	P	-	-	-	-	-
IV	17ES01	Foundation Course I: Environmental Studies #	2	T	3	-	50	50	2
<b>Total</b>			<b>30</b>					<b>525</b>	<b>20</b>
<b>SEMESTER II</b>									
I	17T02/17H02/ 17F02/17S02/ 17M02	Language - II	6	T	3	25	75	100	4
II	17E02	English - II	6	T	3	25	75	100	4
III	17UAPCT201	Core Paper III - Biomedical Instrumentation	6	T	3	25	75	100	4
	17UAPCP202	Core Biochemistry Practicals - I	3	P	3	30	45	75	3
	17UAPAT203	Allied II: Chemistry - II	4	T	3	20	55	75	3
	17UAPAP204	Allied Practicals I: Chemistry Practicals	3	P	3	20	30	50	2
IV	17VE01	Foundation Course II: Value Education #	2	T	3	-	50	50	2
<b>Total</b>			<b>30</b>					<b>550</b>	<b>22</b>



  
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Part	Course code	Course Title	Inst. Hrs /Week	T/P	Examination Details				Credits
					Duration in Hours.	CIA	ESE	Total Marks	
<b>SEMESTER III</b>									
I	17T03/17H03/ 17F03/17S03/ 17M03	Language - III	6	T	3	25	75	100	4
II	17E03	English - III	6	T	3	25	75	100	4
III	17UAPCT301	Core Paper IV- Enzyme and Enzyme Technology	4	T	3	25	75	100	4
	17UAPCT302	Core Paper V- Microbiology	3	T	3	25	75	100	3
	-	Core Biochemistry Practicals - II	2	P	-	-	-	-	-
IV	17UAPAT303	Allied III: Biomathematics	4	T	3	20	55	75	3
	17UAPST304	Skill Based Course I - Nutritional Biochemistry	3	T	3	20	55	75	3
	17NM01	Basic Tamil@/Advanced Tamil# (Or) Non-major Elective - I	2	T	3	-	75	75	2
<b>Total</b>			<b>30</b>					<b>625</b>	<b>23</b>
<b>SEMESTER IV</b>									
I	17T04/17H04/ 17F04/17S04/ 17M04	Language - IV	6	T	3	25	75	100	4
II	17E04	English - IV	6	T	3	25	75	100	4
III	17UAPCT401	Core Paper VI - Intermediary Metabolism	4	T	3	25	75	100	5
	17UAPCP402	Core Biochemistry Practicals - II	3	P	6	30	45	75	3
	17UAPAT403	Allied IV: Computer and Information Technology	4	T	3	20	55	75	3
	17UAPAP404	Allied Practicals II: Computer and Information Technology Lab	2	P	3	20	30	50	2
IV	17UAPST405	Skill Based Course II: Nanotechnology and Clinical trials	3	T	3	20	55	75	3
	17NM02	Basic Tamil@/Advanced Tamil# (Or) Non-major Elective - II	2	T	3	-	75	75	2
<b>Total</b>			<b>30</b>					<b>650</b>	<b>26</b>



  
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Part	Course code	Course Title	Inst. Hrs /Week	T/P	Examination Details			Credits		
					Duration in Hours.	CIA	ESE		Total Marks	
<b>SEMESTER V</b>										
III	17UAPCT501	Core Paper VII - Human Physiology and Endocrinology	5	T	3	25	75	100	4	
	17UAPCT502	Core Paper VIII - Clinical Biochemistry	5	T	3	25	75	100	4	
	17UAPCT503	Core Paper IX- Molecular Biology	5	T	3	25	75	100	4	
	17UAPCP504	Core Biochemistry Practicals - III	5	P	3	30	45	75	3	
	-	Core Biochemistry Practicals - IV	3	P	-	-	-	-	-	
	17UAPET50.	Elective: I	4	T	3	25	75	100	4	
IV	17UAPST508	Skill Based Course III - Medical Coding	3	T	3	20	55	75	3	
	17UAPIT01	Institutional Training*	Completed / Not Completed							
<b>Total</b>			<b>30</b>					<b>550</b>	<b>22</b>	
<b>SEMESTER VI</b>										
III	17UAPCT601	Core Paper X - Medicinal Biochemistry	5	T	3	25	75	100	4	
	17UAPCT602	Core Paper XI - Plant Biochemistry and Plant Therapeutics	5	T	3	25	75	100	4	
	17UAPCT603	Core Paper XII - Immunology and Immunotechniques	4	T	3	25	75	100	4	
	17UAPCP604	Core Biochemistry Practicals - IV	5	P	6	30	45	75	3	
	17UAPE.	Elective: II	4	P	3	40	60	100	4	
	17UAPE.	Elective: III	4	-	3	25	75	100	4	
IV	17UAPST611	Skill Based Course IV- Bioinformatics	3	T	3	20	55	75	3	
V	17NS01/17NC01/ 17PE01/17YR01	Extension Activities - NSS/NCC/Physical Education@	-	-	-	50	-	50	1	
<b>Total</b>			<b>30</b>					<b>700</b>	<b>27</b>	
<b>TOTAL</b>			<b>180</b>					<b>3600</b>	<b>140</b>	

@ Only Continuous Internal Assessment; # Only End Semester Examination

\***Institutional Training:** Students have to undergo Institutional Training during May-June for a period of 15 days and the report of the same to be submitted.



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**KONGU ARTS AND SCIENCE COLLEGE, ERODE - 638 107****(AUTONOMOUS)****List of Elective Courses**

Course Code	List of Elective Courses (Students can choose any one of the papers as Elective)		
17UAPET505	Elective - I	A	Microbial Genetics
17UAPET506		B	Plant and Animal Biotechnology
17UAPET507		C	Genetic Engineering
17UAPEP605	Elective - II	A	Bioinformatics Practicals
17UAPET606		B	Nanomaterials and Nanomedicine
17UAPET607		C	Health and Hygiene
17UAPET608	Elective - III	A	Diagnostic Biochemistry
17UAPET609		B	Sports Biochemistry
17UAPEV610		C	Project*


**List of Allied Courses**

Course Code	Semester	Allied Courses
17UAPAT103	I	Chemistry - I
17UAPAT203	II	Chemistry - II
17UAPAP204	II	Chemistry Practicals
17UAPAT303	III	Biomathematics
17UAPAT403	IV	Computer and Information Technology
17UAPAP404	IV	Computer and Information Technology Lab

**List of Skill Based Courses**

Course Code	Semester	Skill Based Courses
17UAPST304	III	Nutritional Biochemistry
17UAPST405	IV	Nanotechnology and Clinical trials
17UAPST508	V	Medical Coding
17UAPST611	VI	Bioinformatics



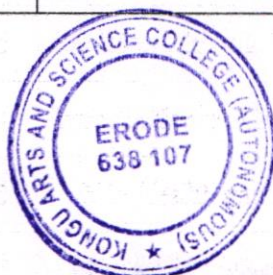
  
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**LIST OF NON – MAJOR ELECTIVE COURSES**

**SEMESTER - III**

S. No	Course Code	Course Name
1	17UAANT305	Effective Business Communication
2	17UABNT307	Fundamentals of Management
3	17UACNT306	Customer Relationship Management
4	17UADNT306	Basics of Commerce
5	17UADNT307	Business Organisation
6	17UAENT307	General Commercial Knowledge
7	17UAFNT307	Company Law
8	17UAGNT307	Fundamentals of Accounting
9	17UAINNT307	Communication in Business
10	17UAINNT407	Principles of e-Commerce
11	17UAJNT306	Web Designing using HTML
12	17UAKNT306	Internet Principles
13	17UALNT306	Introduction to Information Technology
14	17UAMNT306	Fundamentals of Programming
15	17UANNT305	Decision Making Techniques
16	17UAONT304	Introduction to Electronics
17	17UAPNT305	Public Health and Hygiene
18	17UAQNT305	Basics of Human Health and Nutrition
19	17UARNT306	Fundamentals of Textiles
20	17UATNT307	Foundation Cookery



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**LIST OF NON – MAJOR ELECTIVE COURSES**

**SEMESTER – IV**

S. No	Course Code	Course Name
1	17UAANT405	Art of Corporate Communication
2	17UABNT407	Marketing Management
3	17UACNT407	Retail Management
4	17UADNT407	Practical Banking
5	17UADNT408	Services Marketing
6	17UAENT407	Consumerism
7	17UAFNT407	Practical Banking
8	17UAGNT407	Practical Auditing
9	17UAINNT407	Principles of e-Commerce
10	17UAJNP407	Web Designing Lab
11	17UAKNT406	Information Security and Cyber Laws
12	17UALNT406	E-Commerce
13	17UAMNT406	Web Graphics
14	17UANNT405	Statistical Methods
15	17UAONT405	Electrical and Electronic Appliances
16	17UAPNT406	Nutrition and Diet Therapy
17	17UAQNT406	Health Management and Fitness
18	17UARNT406	Basics of Fashion Designing
19	17UATNT413	Cookery



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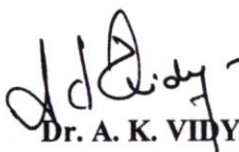
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**List of Advanced Learners Courses (IV Semester)**

S. No	Course Code	Course
1.	17UAPAL407	Biophysics
2.	17UAPAL408	Phytochemistry and Phytochemical Techniques


**List of Advanced Learners Courses (V Semester)**

S. No	Course Code	Course
1.	17UAPAL509	Cancer Biology
2.	17UAPAL510	Entrepreneurship in Life Sciences and Health Care

  
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**Chairman, Board of Studies  
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Sem.	Course Code	PRACTICAL II - CORE BIOCHEMISTRY PRACTICALS II	Total Marks: 75		Hours Per Week	Credits
			CIA: 30	ESE: 45		
III & IV	17UAPCP402				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



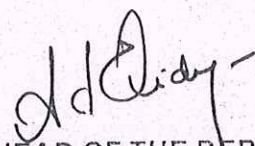
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Reference Books:


1. Experimental Biochemistry: A Student companion - Sashidhar Rao, B and Deshpande, V. IK International (P) Ltd. Publications.
2. Modern Experimental Biochemistry - Boyer, R. Pearson Education
3. Biochemical Methods – Sadasivam, S and Manickam, A. - New Age International Publishers.
4. An Introduction to Practical Biochemistry - Plummer, D. T. Tata McGraw-Hill.
5. Introductory Practical Biochemistry (ed) Sawhney, S. K. Randhir Singh – Narosa Publications House.

Question Paper Pattern

Major Experiment	15 Marks	Minor Experiment	10 Marks	Procedure for (2 Experiments)	10 Marks	Viva Voce	05 Marks	Record	05 Marks
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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.

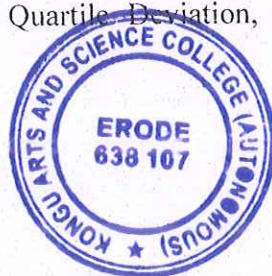
**UNIT III**

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.

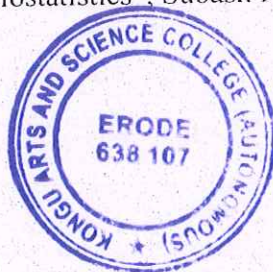
UNIT III Chapter 1, 3, 5, 6: Pages 1 – 5, 9-17, 28-39,61-64, 83-91, 99-119, 131-146

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, 4<sup>th</sup> 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

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

**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**

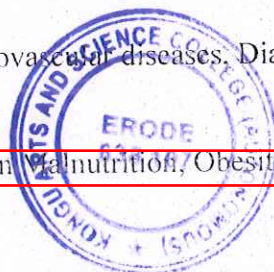
Probiotics – Definition, Types, Mechanism of Action, Applications and Commercial Probiotics. Prebiotics - Definition, Sources and Functions.

**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, Xeroderma.  
 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
			CIA: -	ESE: 75	2	2
IV	17UAPNT305					

**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.

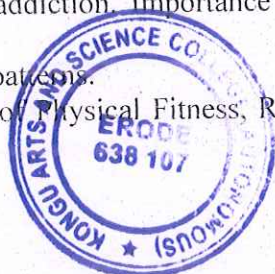
**First Aid** - Management of medical emergencies.

**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 – Disorders of Circadian Timing.

**Health Insurance Schemes** - Government & Non Government Insurance Schemes.

**Text Books:**

1. Park K. "Textbook of Preventive & Social Medicine" 22nd edition, Banarsidas Bhanot publishers, 2013.
2. Roger Detels, Robert Beaglehole, Mary Ann Lansang, Martin Gulliford., "Oxford Textbook of Public Health", 5<sup>th</sup> 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) Preventive & Social Medicine, Jabalpur Messrs Banarcidas Bhanot
5. Birendra Nath Ghosh, (1969) Hygiene & Public Health Calcutta Scientific Publishing Co.

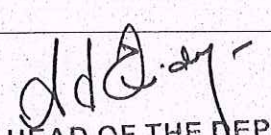
**QUESTION PAPER PATTERN**

**SECTION - A**


**5 X 15 = 75 MARKS**

(Either or Choice)

Two questions from each unit

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

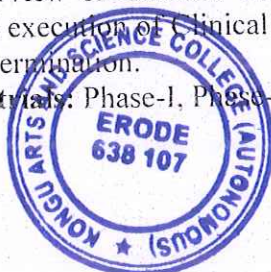
**Synthesis of Nanomaterials:** Top – Down (Ball Milling), Bottom – Up (Sol-Gel Processing), Green synthesis: Use of Bacteria, Fungi and Plants.

**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. Manorama '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
<b>10 x 1 = 10 Marks</b> (Multiple Choice, Four options) Two questions from each unit	<b>5 x 3 = 15 Marks</b> (Either or choice) Two questions from each unit	<b>3 x 10 = 30 Marks</b> (Answer any three Questions) One Question from each unit

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

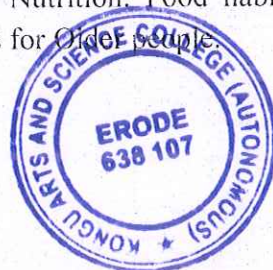
**Diet in Renal diseases:** Renal failure, Urinary calculi- Causes & treatment,

**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, 2<sup>nd</sup> edition (2008).

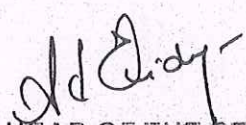
**QUESTION PAPER PATTERN**

**SECTION - A**


**5 X 15 = 75 MARKS**

(Either or Choice)

Two questions from each unit

  
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