SEMESTER I			
Part III Allied – I ALLIED BIOCHEMISTRY -I			
Course Code: 21UCBA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

VISION:

Acquire knowledge about the chemical composition of life.

MISSION:

Understand fundamental biochemical processes.

Knowledge about vitamins and their deficiency.

Study the functions of hormones.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	explain about the chemical composition and the elements of life.	1	Un
CO 2	differentiate direct and indirect method for the determination of energy requirement of man.	2	Un
CO 3	express the importance of bioenergetics.	7	Un
CO 4	compare the biological reaction such as exergonic reaction and endergonic reaction.	3	An
CO 5	demonstrate about the various energy rich compounds such as adenosine triphosphate, guanosine triphosphate, uridinetriphosphate, cytidinetriphosphate and acyl phosphate.	5	Ap
CO 6	distinguish water soluble and fat-soluble vitamins and analyze their composition, functions and deficiency symptoms.	3	An
CO 7	interpret the hormones producing organs and their functions.	3	Cr
CO 8	know about the plant as well as animal hormones.	5	Re
CO 9	identify the antibiotics which are all responsible for affecting cell wall synthesis, cytoplasmic membrane and enzyme systems.	7	Re
CO 10	develop knowledge about the antibiotics interfering with nucleic acid function and inhibiting protein synthesis.	5	Ev

SEMESTER I			
Part III Allied – I ALLIED BIOCHEMISTRY -I			
Course Code: 21UCBA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

UNIT–I INTRODUCTION TO BIOCHEMISTRY

Introduction to biochemistry - scope – chemical composition of life – elements of life – water – biological importance – Energy requirements of the body – Measurement of energy value of foods – Determination of energy requirement of man – Direct method, Indirect method, Respiratory quotients (RQ) of food stuffs – Total heat production – Significance of RQ Basal metabolism – Definition – Conditions for measurement – Factors influencing, Measurement, Significance, Specific dynamic action.

UNIT – II BIOENERGETICS

Introduction – Importance of bioenergetics - Energy and work – thermodynamic principles - Biological reactions – Exergonic reaction – Endergonic reaction – Energy and its forms - Energy rich compounds – Adenosine triphosphate – Guanosine triphosphate – Uridine triphosphate – Cytidine triphosphate – Acyl phosphate - Energy coupling.

UNIT – III VITAMINS

Introduction – definition - Sources of vitamin – Deficiency diseases – provitamins – biological functions - Properties of Vitamins – Classification of vitamins - water soluble (Vitamin B_1, B_2, B_3, B_5, B_6, B_7, B_9 and B_{12}Vitamin C) and fat soluble vitamins (Vitamin – A, D, E and K) and their composition, functions and deficiency symptoms.

UNIT – IV HORMONES

Introduction –Definition – Properties – Biological Functions – Chemical Nature – Hormones secreting glands – Hormones producing organs and their functions - Classification of hormones: based on chemical nature – Functions of Hormones – Plant hormones(Auxins, Gibberllins, Cytokinins, Ethylene, Traumatic acid, Absicisic acid, Morphactins) – Animal hormones (STH, TSH, FSH, LH, LTH, Insulin)

UNIT – V ANTIBIOTICS

Introduction – Definition – Antibiotics affecting cell wall synthesis (pencillin, cephalosporin) – Antibiotics affecting the cytoplasmic membrane – Antibiotics interfering with

Nucleic acid function – Antibiotics inhibiting protein synthesis (streptomycin, erythromycin, neomycin)– Antibiotics affecting enzyme systems – Drug resistance.

Text Books:

1. Dulsy Fatima, L.M. Narayanan, R.P. MeyyanPillai, K. Nallasingam, S. Prasanna Kumar and N. Arumugam.*Biochemistry*.Saras Publications, 2010.
2. Patricia trueman.*Nutritional Biochemistry*. MJP publisher, 2011.
3. L. Veerakumari.*Biochemistry*. MJP Publishers, 2010.

Reference Books:

1. Dr. A.C. Deb. Concepts of *Biochemistry*.Kolkatta:New Central Book Agency, 2001.
2. C.B. Powar, G.R.Chatwal, *Biochemistry*. Himalaya Publishing Ltd, 2002.

SEMESTER II			
Part III Allied - I	**ALLIED BIOCHEMISTRY –II**		
Course Code: 21UCBA21	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

VISION:

Achieve broad based knowledge in concepts and principles of biochemistry.

MISSION:

Provide an opportunity in acquiring knowledge about nutritional biochemistry.
Understand the various pathways involved in cell respiration.
Grasp in-depth knowledge about the biochemistry of blood and respiration.
Familiarize the learners with the techniques involved in biochemistry.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	discuss in detail about the nutritional values of milk, egg, meat, fish, vegetable foods, fruits, tea, coffee, cocoa and alcohol.	1	U
CO 2	analyse the physio-chemical interactions between diet ingredients.	3	An
CO 3	demonstrate the theories of biological oxidation decarboxylation, electron transport system and oxidative phosphorylation.	5	C
CO 4	describe the functions of blood.	1	An
CO 5	discuss in brief about red blood cells, white blood cells, blood platelets, plasma and plasma protein.	6	Ap
CO 6	formulate how the minerals are important in our life.	1	U
CO 7	relate the physical and chemical transport of blood.	1	U
CO 8	interpret the various minerals and their recommended levels in food.	2	R
CO 9	compare the relation between optical and electron microscope.	1	E
CO 10	identify the separated components using paper as well as gel electrophoresis.	6	Ap

UNIT – I NUTRITIONAL BIOCHEMISTRY

Nutritive value ofMilk – Egg – Meat - Fish – Vegetable food (Cereals, Pulses, Nuts, Roots and Tubers, Green leafy vegetables) – Fruits – Tea – Coffee – Cocoa – Alcohol – Principles in balancing a diet - Bioavailability – absorption –effect of drugs on food intake, body weight, nutrient requirements and growth, vitamins and minerals – Energy yielding, Body building and Protective foods.

UNIT – II CELL RESPIRATION AND BIOLOGICAL OXIDATIONS

Introduction – Importance of Biological oxidation – Theories of biological oxidation : oxygen activation theory, hydrogen activation theory – Hydrogen acceptors – Nicotinamide nucleotide – Flavin nucleotide – Cytochrome – Sites – Pathways – Oxidative decarboxylation – Electron transport system – Oxidative Phosphorylation – Energetics of Biological oxidation.

UNIT – III BIOCHEMISTRY OF BLOOD

Introduction –Composition -Colour of Blood - Functions of Blood – (Homeostatic functions, Blood as transport system)- Red Blood Cells – White Blood Cells– Blood Platelets – Plasma – Plasma proteins – Albumin, Globulin (alpha, beta and gamma), Fibrinogen – Functions of plasma proteins - Blood groups – Prevention of Blood Loss -Hemoglobin – Variation in structure Hemoglobin with reduced solubility, altered oxygen affinity.

UNIT - IV MINERALS

Introduction – Classification (Macro elements, Micro elements) –Functions, Distribution, Content level in blood , sources, Recommended Dietary allowances, Absorption and excretion, Factors affecting absorption, Deficiency Disease of Calcium, Phosphorous, Sodium, Potassium, Iron, Copper, Iodine, Fluorine, Zinc and Chromium.

UNIT – V BIOCHEMICAL TECHNIQUES

Introduction –Cell Fractionation (Homogenization, Centrifugation) - Centrifuge – Principle, types – Hand Centrifuge, High Speed Centrifuge – pH meter – Principle, Electrodes used, Applications – Microscopy: Optical and electron Microscope – comparison – Ion probe analysis – Electrophoresis – Paper electrophoresis, Gel electrophoresis –Applications.

Text Books:

1. Dulsy Fatima, L.M. Narayanan, R.P. MeyyanPillai, K. Nallasingam, S. Prasanna Kumar and N. Arumugam.*Biochemistry*. Saras Publications, 2010.
2. Patricia trueman.*NutritionalBiochemistry*. MJP publisher, 2011.
3. L.Veerakumari.*Biochemistry*. MJP Publishers, 2010.

Reference Books:

1. Dr. A.C. Deb.*Concepts of Biochemistry*.Kolkata: Central Book of Agency,2001.

2. C.B. Powar, G. R.Chatwal.*Biochemistry*. Himalaya Publishing Ltd, 2002.

SEMESTER I			
Skill Enhancement Course – I PROFESSIONAL ENGLISH FOR CHEMISTRY - I			
Course Code: 21UCHPE1	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

VISION:

Enhance the language skills of first year chemistry students.

Mission:

Knowledge about the effective communication and the competence level of I year students.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	express their capability in using the language English in Chemistry.	9,10	Un
CO 2	understand the importance of learning English.	9,10	Un
CO 3	express the Language in a confident manner.	9,10	Un
CO 4	compare the need of the English language and its role.	9,10	An
CO 5	demonstrate the importance of writing English.	9,10	Ap
CO 6	familiar with the texts.	9,10	An
CO 7	interpret the importance of listening.	9,10	Cr
CO 8	know about the professional skills.	9,10	Re
CO 9	identify the language level by themselves.	9,10	Re
CO 10	develop knowledge and to improve competency.	9,10	Ev

SEMESTER I			
Skill Enhancement Course –I PROFESSIONAL ENGLISH FOR CHEMISTRY - I			
Course Code: 21UCHPE1	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

UNIT 1: COMMUNICATION

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

Speaking: Pair work and small group work.8

Reading: Comprehension passages –Differentiate between facts and opinion

Writing: Developing a story with pictures.

Vocabulary: Register specific - Incorporated into the LSRW tasks

Why Carrot is orange in colour? - Antoine Lavoisier -Father of Chemistry - The invention of Saccharine - Invention of Hydroxychloroquinone - Marie Curie.

UNIT 2: 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.

The spirit of chemical sciences- the effect of greenhouse gas emission- History of matches and lighters, Invention of Vaseline.

UNIT 3: 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

Alfred noble- his life and work- The soap Bubble- an introduction to nuclear chemistry- Synthetic polymers -biomass and biofuels.

UNIT 4: 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

Bhopal disaster - Xrays- J.J. Thomson Biography and Noble prize - Invention of Anaestheia - Acid Base Chemistry - Home Volcanoes. .

UNIT 5: 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

First hydrogen bomb –Detecting Hazards - How molecules are formed ? - Industrial chemistry- Food Adulteration.

References:

Britannica, T. E. (Ed.) Marie Curie from Encyclopædia Britannica, (2020, April 16).

Wikipedia, T. E. (Ed.).. Marie Curie, (16, June 2020)

https://en.wikipedia.org/wiki/Carrot

https://www.historyofinformation.com/detail.php?id=2928

https://www.britannica.com/biography/Antoine-Lavoisier

Audio and Video link

https://www.acs.org/content/acs/en/molecule-of-the-week/archive/s/saccharin.html#:~:text=Saccharin%20was%20the%20first%20widely,sweet%20taste%20on%20his%20hand.

https://en.wikipedia.org/wiki/Marie_Curie

https://en.wikipedia.org/wiki/Hydroxychloroquine

https://www.ukessays.com/essays/chemistry/green-chemistry-and-its-applications.php

https://www.discovermagazine.com/the-sciences/the-accidental-inventor

https://theconversation.com/a-short-history-of-anaesthesia-from-unspeakable-agony-to-unlocking-consciousness-74748

https://edu.rsc.org/resources/collections/on-this-day-in-chemistry

SEMESTER II			
Skill Enhancement Course – II PROFESSIONAL ENGLISH FOR CHEMISTRY - II			
Course Code: 21UCHPE2	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

VISION:

Achieve students creativity and innovation skills.

MISSION:

Mould the students to develop employability skills.

Enhance the mind flexibility to meet the workplace competence.

Improve the writing reports and language skills.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	discuss with the groups effectively.	9,10	Un
CO 2	understand the importance of writing English.	9,10	Un
CO 3	express the Language without fear.	9,10	Un
CO 4	adapt easily into the workplace environment.	9,10	An
CO 5	inculcate the real values of English.	9,10	Ap
CO 6	familiar with the comprehensional activities and exercises.	9,10	An
CO 7	attend the interview with boldness and enthusiastically.	9,10	Cr
CO 8	know about the impact of English in education.	9,10	Re
CO 9	identify the hidden potential of their own competence.	9,10	Re
CO 10	equip themselves	9,10	Ev

Unit 1- 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.

Nano technology and applications, Natural and Artificial dyes, Green chemistry and its applications.

Unit 2 - 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.

Process of photosynthesis- Alchemist - Periodic table for Chemist, Cements.

Unit 3- Digital Competence

Listening to interviews (subject related)

Speaking: Interviews with subject specialists (usingvideo conferencing skills)

Creating Vlogs (How to become a vlogger and use vlogging tonurture 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.

Polymers - Applications of Spectroscopy -fly ash bricks, Composites, Chemistry – The Central Science.

Unit 4 - Creativity and Imagination

Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites .

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)

Photochemistry, Environmental Chemistry, Glass, Abrasives

Unit 5- 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)

Role of Chemist,Antibiotics, Industrial Chemistry, Paints.

References:

1. https://www.nano.gov/you/nanotechnology-benefits
2. https://www.google.com/search?q=natural+and+artificial+dyes&rlz=1C1CHBD_enIN868IN868&oq=natural+and+artificial+dyes&aqs=chrome..69i57j0i22i30l3j0i390l2.1894j0j7&sourceid=chrome&ie=UTF-8
3. https://en.wikipedia.org/wiki/Photosynthesis
4. https://en.wikipedia.org/wiki/Periodic_table
5. https://www.psd1.org/cms/lib/WA01001055/Centricity/Domain/30/The_Spirit_of_Chemical_Science.pdf
6. https://en.wikipedia.org/wiki/The_Alchemist_(novel)
7. https://www.livescience.com/60682-polymers.html#:~:text=Polymers%20are%20materials%20made%20of,tough%2C%20like%20epoxies%20and%20glass.
8. https://en.wikipedia.org/wiki/Pharmaceutical_industry