

SadakathullahAppa College **(Autonomous)**

(Reaccredited by NAAC at an 'A' Grade. An ISO 9001:2015 Certified Institution)

Rahmath Nagar, Tirunelveli- 11.
Tamil Nadu.

DEPARTMENT OF CHEMISTRY



Draft CBCS SYLLABUS

For

B.Sc. CHEMISTRY

(Applicable for students admitted in June 2021 and onwards)

**(Submitted after the Chemistry BOS Meeting
held on 15-03-2021)**

**CBCS Syllabus – B.Sc. Chemistry
(2021-22 onwards)**

| SEM | Part | P | Title of the paper | S. Code | H/W | L* | T* | P* | C | Marks | | |
|-----|--------|--------|---|-----------|-----|----|----|----|---|-------|---|---|
| | | | | | | | | | | I | E | T |
| I | I | I L-I | இக்காலத்தமிழ் | 21ULTA11 | 6 | | | | 3 | | | |
| | | | Grammar and Translation - I | 21ULAR11 | | | | | | | | |
| | II | II L-I | Communicative English -I | 21ULEN11 | 4 | | | | 4 | | | |
| | III | DSC-I | INORGANIC CHEMISTRY - I | 21UCCH11 | 4 | | | | 4 | | | |
| | III | DSC-II | METHODOLOGY OF PRACTICALS | 21UCCH12 | 2 | | | | 1 | | | |
| | III | P-I | INORGANIC QUANTITATIVE ANALYSIS – I | 21UCCH1P1 | 4 | | | | 3 | | | |
| | III | A-I/1 | BIOCHEMISTRY - I | 21UABC11 | 2 | | | | 1 | | | |
| | III | A-I/1P | ANALYSIS OF CARBOHYDRATES AND FATTY ACIDS | 21UABC1P1 | 2 | | | | 2 | | | |
| IV | AECC-I | | Value Education-I | 21USVE1A | | | | | | | | |
| | | | Value Education-II | 21USVE1B | | | | | | | | |

DEPARTMENT OF CHEMISTRY
PROGRAMME: B.SC. CHEMISTRY
PROGRAMME LEARNING OUTCOMES

| PLO No. | Upon completion of B.Sc. Chemistry Degree Programme, the graduates will be able to: |
|----------------|--|
| PLO 1 | Disciplinary Knowledge: Acquire scientific knowledge and the understanding of major concepts and theoretical principles. |
| PLO 2 | Creative Thinking and Practical Skills / Problem Solving Skills Enrich skills of observation / research related skills to draw logical inferences from scientific experiments/ programming and skills of creative thinking to develop novel ideas. Hone problem solving skills in theoretical, experimental and computational areas and to apply them in research fields and in real life situations. |
| PLO 3 | Sense of inquiry and Skilled Communicator Develop the capability for raising appropriate questions relating to the current/emerging issues encountered in the scientific field and to plan, execute and express the results of experiments / investigations through technical writings as well as through oral presentations. |
| PLO 4 | Ethical Awareness / Team Work / Environmental Conservation and Sustainability Equip them for conducting work as an individual / as a member, or as a leader in diverse teams upholding values such as honesty and precision and thus preventing unethical behaviors such as fabrication, falsification, misrepresentation of data, plagiarism etc to ensure academic integrity. Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well. |
| PLO 5 | Usage of ICT/ Lifelong Learning / Self-Directed Learning Inculcate the habit of learning continuously through the effective adoption of ICT to update knowledge in the emerging areas in Sciences for inventions/discoveries and also to engage in remote / independent learning. |

PROGRAMME SPECIFIC OUTCOMES

| PSO No. | Upon completion of B.Sc. Chemistry Degree Programme, the students will be able to: | POs Mapped |
|----------------|---|-------------------|
| PSO-1 | Demonstrate knowledge of theoretical, Physical, Organic and Inorganic Chemistry and be able to apply the knowledge to analyse a variety of chemical problems. | PLO1 |
| PSO-2 | Enrich laboratory skills to carry out reactions in a Chemical laboratory, analyse the reactions and draw valid conclusions. | PLO2 |
| PSO-3 | Develop oral and written communication skills and to present results of experiments / investigations effectively. | PLO3 |
| PSO-4 | Uphold academic and professional integrity for designing, setting up and carrying out experiments independently/as a group with an understanding of chemical hazards to save the environment. | PLO4 |
| PSO-5 | Learn lifelong independently using ICT to update knowledge in current/ emerging areas. | PLO5 |

SEMESTER – I

| | |
|---------------------|--------------------------------|
| Course Title | INORGANIC CHEMISTRY – I |
| Total Hrs. | 60 |
| Hrs./Week | 4 |
| Sub.Code | 21UCCH11 |
| Course Type | DSC-I, Theory |
| Credits | 4 |
| Marks | 100 |

General Objective:

The course focuses on atomic structure, periodic properties, chemical bonding, oxidation and reduction reactions.

Course Objectives:

The learners will be able to:

| CO | Course Objectives |
|-----------|--|
| CO-1 | Recognize the fundamentals of atoms and various theories associated with it |
| CO-2 | Relate the arrangement of elements in the periodic table and the periodic properties |
| CO-3 | Examine the nature of bonding and shapes of molecules. |
| CO-4 | Revise the MOT of Homo and Hetero nuclear diatomic molecules |
| CO-5 | Estimate an oxidation-reduction reaction based on changes in oxidation numbers across the chemical changes |

UNIT I - Atomic Structure

Bohr Theory of Atomic Model and its limitations – Spectrum of hydrogen – Sommerfeld theory. Dual nature of electron - de - Broglie equation - verification using Davisson and Germer experiment. Heisenberg uncertainty principle and its significance – Compton Effect and photoelectric effect - Schrodinger wave equation (derivation not required)- significance of wave functions, normalization of wave function, radial and angular wave functions- Quantum Numbers and its significances - Pauli's exclusion principle, Hund's rule, Aufbau principle and its limitations

UNIT II - Periodic Table

Long form of periodic Table –s, p, d and f block elements
Variation of properties

- Atomic, ionic radii and covalent radii
- Ionization potential
- Effective nuclear charge and Shielding effect – Slater's rule
- Electron affinity
- Electronegativity: Pauling's – Mulliken's and Allred-Roschow's scales of electronegativity.

UNIT III - Chemical Bonding – I

Ionic bond - general characteristics – radius ratio rule - Lattice energy, Born-Landé equation - Madelung constant – Born Haber cycle.

Covalent bond- Valence bond theory – Heitler and London approach –Molecular orbital theory – LCAO method - Molecular orbital energy level diagrams of homo nuclear diatomic (N_2 , O_2 and F_2) and hetero nuclear diatomic (CO, NO and HF) molecules

Covalent character in ionic compounds - Polarity of covalent – Fajan's rule.

UNIT IV - Chemical Bonding – II

Weak chemical forces – Van der waals, Ion-dipole, dipole-dipole, induced dipole-dipole- Hydrogen bond – types and its effects

Valence Shell Electron Pair Repulsion Theory- postulates – Shape of simple molecules $BeCl_2$, BF_3 , CH_4 , ClF_3 , H_2O and NH_3 .

Hybridisation – structure of CH_4 , $CH_2=CH_2$, $CH\equiv CH$, PCl_5 , SF_6 and IF_7

UNIT V - Oxidation and Reduction

Electronic concept of oxidation and reduction. Oxidation number - assigning oxidation number - Redox reaction - Half reaction. Oxidant - Fe (III), hydrogen peroxide and potassium permanganate and their reduction half reaction. Reductant - Fe (II), oxalic acid and KI and their oxidation half reactions. Disproportionation reactions of MnO_4^{2-} in acid medium. Methods of balancing redox reactions: ion - electron and oxidation number method (only in acid medium) – Standard Electron potential and its applications in Inorganic reactions.

REFERENCE BOOKS

1. Cottan, F.A. *Advanced Inorganic Chemistry*. Wiley. 6thEd. 1996
2. Huhee, J. *Inorganic Chemistry*, pearson publication, 2012.
3. Lee, J.D. *New Concise Inorganic Chemistry*. ELBS 5th Ed. 2002.
4. Madan, R.L., et.al. *Inorganic Chemistry*. S. Chand Co., Ltd. New Delhi. 2003
5. Malik, U. et.al. *Selected Topics in Inorganic Chemistry*. S.Chand.
6. Puri, B.R. et.al. *Principles of Inorganic Chemistry*. Milestone publishers, New Delhi, 2007.
7. Sathya Prakash, G.D. et.al. *Advanced Inorganic Chemistry*. S. Chand

COURSE OUTCOMES

| CO No. | Course Outcomes | PSOs Addressed | Cognitive Level |
|--------|---|----------------|-----------------|
| CO-1 | Explain the fundamental concept of atomic structure, atomic theories, Quantum no, long form of periodic table, chemical bonding, hybridization and oxidation-reduction number | 1,3,5 | Understanding |
| CO-2 | Examine the Effective nuclear charge using Slater's rule and lattice energy using Born-Landé equation | 1,3,5 | Applying |
| CO-3 | Compare MO energy level diagram of HOMO and Hetero nuclear diatomic molecule | 1,3,5 | Analyzing |
| CO-4 | Predict the shapes of the molecules using VSEPR theory | 1,3,4,5 | Evaluating |
| CO-5 | Formulate a balanced redox reaction | 1,3,4,5 | Creating |

RELATIONSHIP MATRIX

| Semester | Course Code | Title of the Course | Hours | Credit | | | | | | |
|-----------------------|---|-------------------------|-------|--------|------|------------------------------------|------|------|------|------|
| I | 21UCCH11 | INORGANIC CHEMISTRY - I | 60 | 4 | | | | | | |
| Course Outcomes (COs) | Programme Learning Outcomes (PLOs) | | | | | Programme Specific Outcomes (PSOs) | | | | |
| | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO-1 | ✓ | | | | ✓ | ✓ | | ✓ | | ✓ |
| CO-2 | ✓ | | ✓ | | ✓ | ✓ | | ✓ | | ✓ |
| CO-3 | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | | ✓ |
| CO-4 | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| CO-5 | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| | Number of matches (✓) = 34 (High) Relationship = Low/Medium/High Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33) | | | | | | | | | |

Prepared by

Name: Dr. Sheik Muhideen Badhusha

Signature:

Checked by

Head of the Department

SEMESTER – I

| | |
|---------------------|----------------------------------|
| Course Title | METHODOLOGY OF PRACTICALS |
| Total Hrs | 30 |
| Hrs/Week | 2 |
| Sub.Code | 21UCCH12 |
| Course Type | Theory |
| Credits | 1 |
| Marks | 100 |

General Objectives:

This course focuses on the general laboratory practices, principles and methods involved in qualitative and quantitative analysis

Course Objectives:

The learner will be able to

| CO | Course Objectives |
|-----------|--|
| CO-1 | Understand the general laboratory safety rules |
| CO-2 | Illustrate the principles involved in titrimetric analysis |
| CO-3 | Examine the tests for inorganic qualitative analysis and interpret them |
| CO-4 | Synthesize the principles, apparatus and mechanism of precipitation in gravimetric analysis. |
| CO-5 | Explain the tests for analysing an organic compound |

UNIT I GENERAL LABORATORY PRACTICES

Understanding the details on the label of reagent bottles – Cleaning of glass apparatus - Dilution of concentrated solution – Quantitative transfer of a substance to a graduated flask.

General chemical hazards – General laboratory safety rules – Laboratory environment - First aid measures – cuts/bleeding, burns, flammable liquid spill, fire accidents, eye accidents, chemical spill on skin.

Description of Pipette, Burette, graduated flask and their calibration.

UNIT II TITRIMETRIC ANALYSIS

Terminology: titrant, titrate, titration, standardisation, End point, standard solution (primary and secondary), characteristics of a primary standard solution.

Methods of expressing concentration - Normality, Molality, Molarity (with simple problems) - Molarity and normality of common acids and bases.

Types of indicators - Internal, External, Self, Adsorption.

Principles involved in volumetric analysis – acid base, precipitation, complexometric and redox (permanganometry, dichrometry, iodo and iodimetry) reactions.

UNIT III INORGANIC QUALITATIVE ANALYSIS

Semi-micro analysis: Apparatus used – Techniques – heating, warming, evaporation – Flames – oxidising and reducing flames - Preliminary tests - Flame test charcoal cavity test, borax bead test - Elimination of interfering acid radicals - Chromate, borate, oxalate, fluoride

and phosphate - Preparation of original solution - Group separation of basic radicals – precipitating reagents involved in group fixing and its reactions.

UNIT IV GRAVIMETRIC ANALYSIS

Principle, requirements, Apparatus used and Mechanism of precipitation – factors affecting the solubility of precipitates - Precipitation methods - Co-precipitation and post-precipitation – Differences and prevention - precipitation from homogeneous solution - Steps involved in gravimetric analysis - solution, precipitation, filtration, drying, ignition and incineration and weighing – Estimation of Nickel and zinc.

Errors – types - accuracy and precision.

UNIT V ORGANIC ANALYSIS

Preliminary examination – Nature of state, Colour, Odour, Flame test, Solubility test.

Detection of elements - Lassaigne's test for nitrogen, halogens and sulphur - Test for functional groups - Sodium bicarbonate test, Ester formation test, Neutral ferric chloride test, Libermann's test, Schiff's reagent test, Tollen's test, 2, 4 - dinitrophenyl hydrazine test, Molisch test, Seliwanoff's test, Mulliken Barker test, Diazotisation reaction (Dye test), Osazone test.

Determination of melting point and boiling point.

REFERENCE BOOKS

1. Ghoshal Mahapatra & Nad. *An advanced course in Practical chemistry*: New Central Book Agency (P) Ltd.: Kolkatta, 2000.
2. Kamboj P.C. *University Practical Chemistry*: Vishal Publishing Co.: Punjab, 2010.
3. Mukhopadhyay R. and Chatterje P. *Advanced Practical Chemistry*: Arunabha Sen Books & Allied(P) Ltd.: Kolkata, 2007.
4. Svehla. *Revised Vogel's Qualitative Inorganic Analysis*: Dorling Kindersley Pvt.Ltd.: New Delhi. 2009.
5. Vishnoi N.K. *Advanced Practical Chemistry*: Vikas Publishing House: New Delhi. 2005.
6. Vogel A.I. *A Text Book of Practical Organic Chemistry, including Qualitative Organic Analysis* : 5th edition: Longman Scientific and Technical: New York, 1989.
7. Vogel's Text Book of Chemical Analysis 5th Edition, GiH.Jeffery, J.Bassett, J.Mendham, R.C.Denney, Longman Group UK Limited, 1989, ISBN 0-582-446-93-7

Course Outcomes

| CO | Course Outcomes | PSOs Addressed | Cognitive Level |
|------|--|----------------|-----------------|
| CO-1 | Discuss the terminologies and principles involved in titrimetric and gravimetric analysis. | 1,2,5 | Understanding |
| CO-2 | Demonstrate the general chemical hazards and use the first aid measures to be carried in chemistry laboratory. | 1,4,5 | Applying |
| CO-3 | Calculate the normality, molarity and molality of solutions. | 1,2,5 | Applying |
| CO-4 | Point out the tests for Inorganic qualitative and organic analysis | 1,2,3 | Analyzing |
| CO-5 | Verify errors in chemical analysis by estimating the melting point and boiling point of a sample. | 1,2,3,5 | Evaluating |

Relationship Matrix

| Semester | Course Code | Title of the Course | Hours | Credit | | | | | | |
|--|------------------------------------|---------------------------|-------|--------|-------|------------------------------------|-------|-------|-------|-------|
| I | 21UCCH12 | METHODOLOGY OF PRACTICALS | 30 | 1 | | | | | | |
| Course Outcomes (COs) | Programme Learning Outcomes (PLOs) | | | | | Programme Specific Outcomes (PSOs) | | | | |
| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
| CO-1 | ✓ | ✓ | | | ✓ | ✓ | ✓ | | | ✓ |
| CO-2 | ✓ | | | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| CO-3 | ✓ | ✓ | | | ✓ | ✓ | ✓ | | | ✓ |
| CO-4 | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| CO-5 | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Number of matches (✓) = 32 Relationship = Medium Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33) | | | | | | | | | | |

Prepared by
Name and Signature
P. JESLIN KANAGA INBA

Checked by
Head of the Department

SEMESTER – I

| | |
|---------------------|--|
| Course Title | INORGANIC QUANTITATIVE ANALYSIS – I |
| Total Hrs. | 60 |
| Hrs./Week | 4 |
| Sub.Code | 21UCCH1P1 |
| Course Type | Practical |
| Credits | 3 |
| Marks | 100 |

General Objective:

This course focuses on the estimation of the concentration of compounds present in a solution by titration and to practice the calibration of burette, pipette and weighing balance.

Course Objectives:

The learner will be able to:

| CO No. | Course Objectives |
|---------------|--|
| CO-1 | Understand the concept of different titrations and its uses. |
| CO-2 | Prepare solutions of known concentrations |
| CO-3 | Figure out the required quantity of a chemical substance accurately |
| CO-4 | Select the best method of volumetric titration to be applied for the experiment |
| CO-5 | Determine the type of indicator to be applied and identify the end point for a given titration based on the conditions |

I. Preparation of solutions of different normality and molarity of titrants

II. Volumetric Analysis:

Acidimetry-Alkalimetry:

1. Estimation of Sodium Hydroxide
2. Estimation of Acetic acid in commercial vinegar
3. Estimation of Carbonate in washing soda.
4. Estimation of Bicarbonate in baking soda.

Permanganometry:

1. Estimation of Ferrous ion.
2. Estimation of Oxalic acid

Dichrometry:

1. Estimation of Ferrous ion by diphenylamine as internal indicator.
2. Estimation of Ferrous ion by potassium ferricyanide as an external indicator.

Course Work

1. Calibration of burette, pipette and balance.

2. Estimation of Sodium carbonate and Sodium bicarbonate in a mixture by Walden's method.
3. Estimation of Ferrous ion and Oxalic acid in a mixture.

Reference Books:

1. Ahluwalia, V. K., Dhingra, S., Gulati, A., *College Practical Chemistry*, Universities Press, 2005, ISBN: 9788173715068.
2. Bajpai, D. N., Pandey O. P. and Giri, S., *Practical Chemistry*, S Chand & Co Ltd, 2013, ISBN: 9788121908122.
3. Jeffery G. H., Bassett J., Mendham J., Denney. R C., *Vogel's Text book of Quantitative Chemical Analysis*, Fifth Edition, Longman Scientific and Technical, UK, 1989
4. Mukhopadhyay, R., Chatterjee, P., Arunabha Sen R., *Advanced Practical Chemistry*, Books & Allied(P) Ltd., Kolkata, 2007.
5. Nad, A.K., Mahapatra, B., Ghoshal, A., *Advanced Course in Practical Chemistry*, New Central Book Agency (P) Ltd., Kolkata, 2000.
6. Vishnoi, N. K., *Advanced Practical Chemistry*, Vikas Publishing House, New Delhi, 2005.

Course Outcomes

| CO | Course Outcomes | PSOs Addressed | Cognitive Level |
|------|--|----------------|-----------------|
| CO-1 | Identify primary, secondary, link solutions and indicator. | 1,2,3,4 | Understanding |
| CO-2 | Calculate the amount of carbonate and bicarbonates, ferrous ion and oxalic acid in the mixture. | 1,2,3,4 | Applying |
| CO-3 | Check the quantity of carbonates, bicarbonates, acetic acid, sodium hydroxide and oxalic acid in the given sample. | 1,2,3,4 | Evaluating |
| CO-4 | Estimate the amount of ferrous ion using Diphenylamine and Potassium Ferricyanide as indicators. | 1,2,4 | Evaluating |
| CO-5 | Formulate standard solutions with different concentrations. | 1,2,4,5 | Creating |

Relationship Matrix

| Semester | Course Code | Title of the Course | | | | | Hours | Credit | | |
|--|------------------------------------|-------------------------------------|-------|-------|-------|------------------------------------|-------|--------|-------|-------|
| I | 21UCCH1P1 | INORGANIC QUANTITATIVE ANALYSIS - I | | | | | 60 | 3 | | |
| Course Outcomes (COs) | Programme Learning Outcomes (PLOs) | | | | | Programme Specific Outcomes (PSOs) | | | | |
| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
| CO-1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| CO-2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| CO-3 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| CO-4 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| CO-5 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Number of matches (✓) = 41. Relationship = Low / Medium /High✓ Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33) | | | | | | | | | | |

Prepared by

Name: Dr. I. Antony Danish

Signature:

Checked by

Head of the Department

SEMESTER – I

| | |
|---------------------|-------------------------|
| Course Title | BIOCHEMISTRY – I |
| Total Hrs | 30 |
| Hrs/Week | 2 |
| Sub.Code | 21UABC11 |
| Course Type | Theory |
| Credits | 1 |
| Marks | |

General Objectives:

This course emphasises on the Occurrence, classifications, reactions, structure and metabolism of carbohydrates and lipids.

Course Objectives:

The learner will be able to

| CO | Course Objectives |
|-----------|---|
| CO-1 | Describe the classification, reactions, structure and qualitative tests of carbohydrates. |
| CO-2 | Discuss the major pathways of carbohydrate metabolism. |
| CO-3 | Examine the lipids |
| CO-4 | Determine the fatty acids by iodine number, acid number, saponification value and RM value. |
| CO-5 | Revise the structure and functions of fatty acids |

UNIT I CARBOHYDRATE I

Carbohydrates – Occurrence, functions, classifications and biochemical importance – Reactions, structure and qualitative tests for glucose and fructose (structural elucidation not required) – mutarotation – epimerization – glycosides - Interconversion of monosaccharide - D - Arabinose to D - Glucose and vice - versa. D - Glucose to D - fructose and vice - versa.

UNIT II CARBOHYDRATE II

Disaccharides – occurrence, biochemical importance, structure, reactions and qualitative tests for maltose, sucrose and lactose (structural elucidation not required) – inversion of sucrose.

Polysaccharides – homopolysaccharides – Occurrence, structure and uses of starch and cellulose - heteropolysaccharides – composition, functions and structure of hyaluronic acid and chondroitin sulphate.

UNIT III CARBOHYDRATE METABOLISM

Metabolism – Basic concepts of catabolism and anabolism and its pathway.

Major pathways of carbohydrate metabolism - Embden-Meyerhof pathway (or) glycolysis, TCA cycle, gluconeogenesis, glycogenesis and HMP shunt - salient features and its reactions.

UNIT IV LIPIDS

Lipids – classification and functions – fatty acids – occurrence and classification – essential fatty acids – functions and deficiency – triacylglycerol – properties – determination of fatty acids – iodine number, saponification value, acid number and Reichert-Meissl (RM) number.

Cholesterol – occurrence, structure and functions.

UNIT V LIPID METABOLISM

Body fuel reserve, fatty acid oxidation - β oxidation - Ketone bodies, Ketogenesis - Biosynthesis of fatty acids – Palmitate, Structure of fatty acid synthase complex – functional significance, comparison between fatty acid synthesis and β oxidation.

REFERENCE BOOKS

1. Donald Voet, Judith G. Voet. *Biochemistry*, 4th edition: John Wiley & sons: New York, 2010.
2. Jain J.L. *Fundamentals of Biochemistry*, S. Chand & Co. Ltd.: New Delhi, 2005.
3. Kuchel P.W. and Ralstol G.B. *Biochemistry*, Schaum's Outlines, Tata McGraw Hill Publishing Company Ltd.: New Delhi, 2005.
4. Satyanarayana U. & Chakrapani U. *Biochemistry*, 4th edition: Elsevier: India, 2013.
5. Stryer L. *Biochemistry*, 5th edition: W.H. Freeman and Company: New York, 2002.
6. Thomas M. Delvin. *Textbook of Biochemistry*, 7th edition: John Wiley & sons: New York, 2010.

Course Outcomes

| CO | Course Outcomes | PSOs Addressed | Cognitive Level |
|------|--|----------------|-----------------|
| CO-1 | Describe the Occurrence, functions, classifications, reactions and biochemical importance of carbohydrates and lipids. | 1,5 | Understanding |
| CO-2 | Explain the basic concepts of metabolism, ketone bodies and ketogenesis. | 1,5 | Understanding |
| CO-3 | Calculate the biochemical tests (iodine number, saponification number, acid number and RM number) for purity of fatty acids | 1,2,3,5 | Applying |
| CO-4 | Analyse the qualitative tests for carbohydrates | 1,2,3,5 | Analyzing |
| CO-5 | Assess the pathways involved in glycolysis, TCA cycle, gluconeogenesis, glycogenesis, HMP shunt, fatty acid synthase complex and fatty acid oxidation. | 1,3,5 | Evaluating |

Relationship Matrix

| Semester | Course Code | Title of the Course | Hours | Credit | | | | | | |
|--|------------------------------------|---------------------|-------|--------|-------|------------------------------------|-------|-------|-------|-------|
| I | 21UABC11 | BIOCHEMISTRY-I | 30 | 1 | | | | | | |
| Course Outcomes (COs) | Programme Learning Outcomes (PLOs) | | | | | Programme Specific Outcomes (PSOs) | | | | |
| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
| CO-1 | ✓ | | | | ✓ | ✓ | | | | ✓ |
| CO-2 | ✓ | | | | ✓ | ✓ | | | | ✓ |
| CO-3 | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ |
| CO-4 | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ |
| CO-5 | ✓ | | ✓ | | ✓ | ✓ | | ✓ | | ✓ |
| Number of matches (✓) = 30 Relationship = Medium Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33) | | | | | | | | | | |

Prepared by
Name and Signature
P. JESLIN KANAGA INBA

Checked by
Head of the Department

SEMESTER – I

| | |
|---------------------|--|
| Course Title | ANALYSIS OF CARBOHYDRATES AND FATTY ACIDS |
| Total Hrs | 30 |
| Hrs/Week | 2 |
| Sub.Code | 21UABC1P1 |
| Course Type | Practical |
| Credits | 2 |
| Marks | 100 |

General Objectives:

This course emphasizes on the identification, estimation of carbohydrates and acid number, saponification number and iodine number of oil.

Course Objectives:

The learner will be able to

| CO | Course Objectives |
|-----------|---|
| CO-1 | Distinguish mono, di and polysaccharides |
| CO-2 | Calculate the amount of glucose present in the sample |
| CO-3 | Determine the acid number of oil |
| CO-4 | Examine the fatty acid |
| CO-5 | Assess the saponification number and iodine number of oil |

I Qualitative analysis of carbohydrates

1. Analysis of monosaccharides – glucose and fructose.
2. Analysis of disaccharides - Maltose, lactose and sucrose.
3. Analysis of polysaccharides – Starch

II Quantitative analysis

1. Estimation of glucose by colorimetric method.
2. Estimation of acid number of oil.
3. Estimation of fatty acids

Course Work

1. Estimation of saponification Value of oil.
2. Estimation of iodine number of oil.

REFERENCE BOOKS

1. Geetha Damodaran. *Practical Biochemistry*: Jaypee Brothers Medical Publishers (P) Ltd.: New Delhi, 2011.
2. Jeyaraman J. *Laboratory Manual in Biochemistry*: New Age International Publishers: India, 2011.
3. Mary Vijaya T., Mani M.L., Sunitha Kumari K. & Asha K.R.T. *Practical Clinical Biochemistry Manual*, Rishi Publications: Kalikavilai, 2003.
4. Palanivelu D.R. *Laboratory manual for Analytical Biochemistry & Separation Techniques*: School of Biotechnology, Madurai Kamaraj University: Madurai. 2000.

Course Outcomes

| CO | Course Outcomes | PSOs Addressed | Cognitive Level |
|------|---|----------------|-----------------|
| CO-1 | Distinguish mono- , di- and poly saccharides. | 1,2 | Understanding |
| CO-2 | Examine glucose, fructose, maltose, lactose, sucrose, starch and cellulose. | 1,2,3 | Applying |
| CO-3 | Investigate the amount of glucose present in the sample. | 1,2,3,4 | Analyzing |
| CO-4 | Measure the acid number, saponification value and iodine number of oil. | 1,2,3,4 | Evaluating |
| CO-5 | Estimate the fatty acids. | 1,2,3,4 | Evaluating |

Relationship Matrix

| Semester | Course Code | Title of the Course | | | | | Hours | Credit | | |
|--|------------------------------------|--|-------|-------|-------|------------------------------------|-------|--------|-------|-------|
| I | 21UABC1P1 | ANALYSIS OF CARBOHYDRATES AND FATTY ACIDS | | | | | 30 | 2 | | |
| Course Outcomes (COs) | Programme Learning Outcomes (PLOs) | | | | | Programme Specific Outcomes (PSOs) | | | | |
| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
| CO-1 | ✓ | ✓ | | | | ✓ | ✓ | | | |
| CO-2 | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| CO-3 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| CO-4 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| CO-5 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| Number of matches (✓) = 34 Relationship = High Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33) | | | | | | | | | | |

Prepared by
Name and Signature
P. JESLIN KANAGA INBA

Checked by
Head of the Department