Structure of Four year Integrated Programme B.Sc. B.Ed. Mathematics

SEMESTER IV

Part	Study Components – Course Title	Insti. hrs. per week	Weeks per semester	Hours per semester	Exam Hrs	Max. Marks		Total
						Int	Ext	
I	General Tamil – IV	6	20	120	3	30	70	100
II	Language Through Literature - II	6	20	120	3	30	70	100
III	Core Paper - VII Linear Algebra and Boolean Algebra	6	20	120	3	30	70	100
III	Core Paper - VIII Real Analysis II	6	20	120	3	30	70	100
III	Statistics II	6	20	120	2	25	50	75
IV	Contemporary India and Education Part - II	3	20	60	1(1/2)	15	35	50
IV	EPC 2 – Drama and Art in Education	3	20	60	-	50	-	50
Total		**36**		**720**				**575**

Structure of Four year Integrated Programme B.Sc. B.Ed. Physical Science

(PHYSICS)

SEMESTER IV

Part	Study Components – Course Title	Insti. hrs. per week	Weeks per semester	Hours per semester	Exam Hrs	Max. Marks		Total
						Int	Ext	
I	General Tamil-III	6	20	120	3	30	70	100
II	Language Through Literature -I	6	20	120	3	30	70	100
III	Core Paper- IV Electricity and Magnetism	6	20	120	3	30	70	100
III	Extensible Learning Physics - IV	3	20	60	2	25	50	75
III	Core Practical- II	3	20	60	3	40	60	100
III	Allied Chemistry - II	4	20	80	3	15	60	75
III	Allied Chemistry Practicals	2	20	40	3	20	30	50
IV	Contemporary India and Education Part - II	3	20	60	1(1/2)	15	35	50
IV	EPC 2 – Drama and Art in Education	3	20	60	-	50	-	50
Total		**36**		**720**				**550**

Structure of Four year Integrated Programme B.Sc. B.Ed. Physical Science

(CHEMISTRY)

SEMESTER IV

Part	Study Components – Course Title	Insti. hrs. per week	Weeks per semester	Hours per semester	Exam Hrs	Max. Marks		Total
						Int	Ext	
I	General Tamil-III	6	20	120	3	30	70	100
II	Language Through Literature - I	6	20	120	3	30	70	100
III	Core paper IV – Inorganic, Organic and Physical Chemistry – IV	6	20	120	3	30	70	100
III	Chemistry for School Education paper-IV	3	20	60	2	25	50	75
III	Core Practical - II	3	20	60	3	40	60	100
III	Allied Physics - II	4	20	80	3	15	60	75
III	Allied Physics Practical	2	20	40	3	20	30	50
IV	Contemporary India and Education Part - II	3	20	60	1(1/2)	15	35	50
IV	EPC 2 – Drama and Art in Education	3	20	60	-	50	-	50
Total		**36**		**720**				**550**

Structure of Four year Integrated Programme B.Sc. B.Ed. Biological Science

(BOTANY)

SEMESTER IV

Part	Study Components – Course Title	Insti. hrs. per week	Weeks per semester	Hours per semester	Exam Hrs	Max. Marks		Total
						Int	Ext	
I	General Tamil – III	6	20	120	3	30	70	100
II	Language Through Literature - I	6	20	120	3	30	70	100
III	Core Paper - IV Taxonomy of Angiospersms and Economic Botany	6	20	120	3	30	70	100
III	Bio basics - IV - Botany	3	20	60	2	25	50	75
III	Core Practical - II	3	20	60	3	40	60	100
III	Allied Chemistry - II	4	20	80	3	15	60	75
III	Allied Chemistry Practicals	2	20	40	3	20	30	50
IV	Contemporary India and Education Part - II	3	20	60	1(1/2)	15	35	50
IV	EPC 2 – Drama and Art in Education	3	20	60	-	50	-	50
Total		**36**		**720**				**550**

Structure of Four year Integrated Programme B.Sc. B.Ed. Biological Science

(ZOOLOGY)

SEMESTER IV

Part	Study Components – Course Title	Insti. hrs. per week	Weeks per semester	Hours per semester	Exam Hrs	Max. Marks		Total
						Int	Ext	
I	General Tamil-III	6	20	120	3	30	70	100
II	Language Through Literature -I	6	20	120	3	30	70	100
III	Core Paper- IV Genetics	6	20	120	3	30	70	100
III	Basic Zoology - IV	3	20	60	2	25	50	75
III	Core Practical - II	3	20	60	3	40	60	100
III	Allied Chemistry - II	4	20	80	3	15	60	75
III	Allied Chemistry Practicals	2	20	40	3	20	30	50
IV	Contemporary India and Education Part - II	3	20	60	1(1/2)	15	35	50
IV	EPC 2 – Drama and Art in Education	3	20	60	-	50	-	50
Total		**36**		**720**				**550**

SEMESTER - IV

GENERAL TAMIL - IV

பாடவேளை - 120 மணிகள் **SUBJECT CODE:**

பொதுநோக்கம்:

1. எட்டுத்தொகை நூல்களின் பாடப்பொருளை அறிந்துகொள்ளல்,
2. பத்துப்பாட்டு நூல்களின் பட்டினப்பாலை, சிறுபானாற்றுப்படையின் கருத்தினை புரிந்துகொள்ளல்,
3. திருக்குறளின் கருத்தினை வாழ்வில் பயன்படுத்தல்,
4. சங்க இலக்கியங்களின் சிறப்பியல்புகளை அறிந்துகொள்ளல்,
5. மொழிபெயர்ப்புத் திறன்களை வளர்த்தல்,

அலகு– 1

புறநானூறு	-	பாடல் எண்	:	18 நீரும் நிலமும்……..
				91 எமக்கு ஈத்தனையே…..
				74 குழவி இறப்பினும்…..
				216 கேட்டல் மாத்திரை….
அகநானூறு	-	பாடல் எண்	:	34 சிறுகரும்பிடவின்…(முல்லை)
				124 நன்கலம் களிற்றொடு…(முல்லை)
				134 வானம் வாய்ப்ப…
நற்றிணை	-	பாடல் எண்	:	01 நின்றசொல்லர்..
				110 பரசங் கலந்த…
				172 விளையாடுஆயமொடு..
குறுந்தொகை	-	பாடல் எண்	:	03 நிலத்தினும் பெரிதே…
				25 யாரும் இல்லைதானேகள்வின்..
				38 கானமஞ்சைஅறை..
				40 யாயும் ஞாயும்…
				58 இடிக்குங் கேளிர்..!
ஐங்குநுறூறு	-	பாடல் எண்	:	வேட்கை பத்து
கலித்தொகை	-	பாடல் எண்	:	09 எறித் தருகதிதாங்கி
				11 அரிதாயஅறனெய்தி…

அலகு– 2

பட்டினப்பாலை	-	(120 முதல் 220 வரிகள் வரை)
சிறுபாணாற்றுப்படை	-	(கடையெடுவள்ளல்களின் சிறப்பு, நல்லியக் கோடனின் தலைமைச் சிறப்பு மட்டும்)

அலகு– 3

திருக்குறள்	-	அறிவுடைமை நட்பிராய்தல் ஆள்வினை உடைமை கள் உண்ணாமை பொழுதுகண்டு இரங்குதல்

அலகு– 4

இலக்கியவரலாறு	-	1. சங்க இலக்கியமும் அதன் சிறப்பியல்புகளும் 2. திருக்குறளின் அமைப்பும் சிறப்பும்.

அலகு– 5

நாடகம் - மனோன்மணியம் - நாடகம் - ஆசிரியர்– சுந்தரம்பிள்ளை

அலகு– 6

- 1.மொழிபெயர்ப்பு(ஆங்கிலத்திலிருந்து தமிழுக்கு)
- 2. மொழித்திறன் - நிறுத்தக்குறிகள்.
- 3. தன்விவரப் படிவம் தயாரித்தல்.
- 4. செய்திசேகரித்தல்,நேர்காணல்.

பார்வை நூல்கள்:

1. துரைசாமிப்பிள்ளை.சு.ஒளவை (1951), புறநானூறு, சென்னை: சைவ சித்தாந்த பதிப்பகம்.
2. வேங்கடசாமிப்பிள்ளை, (2008), அகநானூறு, சென்னை: சைவ சித்தாந்த பதிப்பகம்.
3. நாராயணசாமி ஐயர்.அ. (1952), நற்றிணை, சென்னை: சைவ சித்தாந்த பதிப்பகம்.
4. சோமசுந்தரனார். பொ.வே. (2007), குறுந்தொகை, சென்னை: சைவ சித்தாந்த பதிப்பகம்.
5. சோமசுந்தரனார். பொ.வே.(1961), ஐங்குறுநூறு, சென்னை: சைவ சித்தாந்த பதிப்பகம்.
6. நச்சினார்க்கினியார், (1943), கலித்தொகை, சென்னை: சைவ சித்தாந்த பதிப்பகம்.
7. சோமசுந்தரனார். பொ.வே.(2008), பத்துப்பாட்டு, சென்னை: சைவ சித்தாந்த பதிப்பகம்
8. தேவநேய பாவனார் (2000), திருக்குறள் , சென்னை: இந்து பப்ளிகேஷன்.
9. பெ.சுந்தரம் பிள்ளை (1950), மனோன்மணியம், சென்னை: சைவ சித்தாந்த பதிப்பகம்.

LANGUAGE THROUGH LITERATURE – II

SUBJECT CODE:

OBJECTIVE

- To attain proficiency in communication skills.

UNIT I – PROSE

1. Thoughts at the Ferry - E.V. Lucas
2. A Disappointed Man - Robert Lynd

UNIT II – POETRY

1. Thou Art Indeed Just, Lord - Gerard Manley Hopkins
2. Hawk Roosting - Ted Hughes

UNIT III – SHORT STORIES

1. After Twenty Years - O. Henry
2. The Shephere's Daughter - William Saroyan

UNIT – IV – SPOKEN ENLGIHS

1. Offering help
2. Apologizing
3. Making suggestions
4. Expressing likes and dislikes
5. Leave taking
6. Agreeing and disagreeing

UNIT - V

1. Developing hints into a paragraph.
2. Write a dialogue based on the given situation

References

1. "Menon K.P.K, (2005). *Prose in practice*. Chennai: Macmillan India.
2. Natarajan. K, (2011). *The musical thought*. Chennai: New Century Book House.
3. Radhakrishna Pillai.G & Rajeevan.K, (2014). *Spoken english for you.* New Delhi: Emerald Publishers.

MATHEMATICS

CORE PAPER – VII
LINEAR ALGEBRA AND BOOLEAN ALGEBRA

SUBJECT CODE:

(120 Hours)

UNIT-I

Vector Spaces: Introduction – Definition and Examples – Subspaces – Linear Transformation – Span of a set – Linear Independence – Basis and Dimension – Rank and Nullity – Matrix of a Linear Transformation.

UNIT-II

Inner Product Spaces: Introduction – Definition and Examples – Orthogonality – Orthogonal Complement.

UNIT-III

Bilinear forms: Introduction – Bilinear forms – Quadratic forms.

UNIT-IV

Lattices: Introduction – Partially ordered sets – Lattices – Distributive Lattices – Modular Lattices.

UNIT-V

Boolean algebra: Definition – Principle of Duality – Sub-algebra – Boolean Function – Disjunctive Normal Form – Conjunctive Normal Form – Conversion – Switching Circuits.

REFERENCES

1. Arumugam S.and Thangapandi Isaac A.(1996),*Morden Algebra*, Scitech Publications, Chennai.
2. Schaums outline series, (1999).*Boolean algebra and switching circuits*, Tata McGraw Hill.

CORE PAPER – VIII
REAL ANALYSIS II
(120 Hours)

SUBJECT CODE:

UNIT-I

Metric Spaces $C[a, b]$: Pointwise convergence, Uniform convergence, Test for uniform convergence, The metric space $C[a, b]$.

UNIT-II

Contraction mapping and its Applications: Introduction - Definition - Examples, Contraction mapping theorem.

UNIT-III

Completion of a metric space: Introduction - Definition - Examples, Completness.

UNIT-IV

Differentiability of a function - Differentiability and continuity, Chain rule, Rolle's theorem and Mean value theorems.

UNIT-V

Definition, existence and properties of Riemann integral - First and second fundamental theorem of Calculus - Mean value theorem of Integral calculus, Taylor's series - Taylor's theorem.

REFERENCES

1. Arumugam S. and Thangapandi Isaac A.,(1996). *Modern Analysis*, New Gamma Publishing House.
2. Golberg R., (1985).*Methods of Real Analysis*, Oxford and IBH Publishing Co.

STATISTICS II
(120 Hours)

SUBJECT CODE:

UNIT-I

Theoretical, continuous Distributions – Rectangular distribution – Normal distribution characteristics of normal distribution – Mode of a normal distribution – Moment generating function – Cumulants – Points of inflexion of normal curve – mean deviation from mean for normal distribution – Area property – Fitting of normal distribution – Problems.

UNIT-II

Correlation and regression – Coefficient of correlation for a Bivariate Frequency – Rank correlation – Regression lines.

UNIT-III

Sampling and Large sample tests and chi square distribution.

UNIT-IV

Exact sampling Distributions – Small sample tests.

UNIT-V

Analysis of Variance – Design of Experiments – Latin square.

REFERENCES

1. Gupta S.C. and Kapoor V.K., (2001). *Elements of Mathematical statistics* third edition, Sultan Chand & Sons
2. Gupta S.P., (2001).*Statistical Methods*, Sultan Chand and sons.

PHYSICS

CORE PAPER - IV
ELECTRICITY AND MAGNETISM
(120 Hours)

SUBJECT CODE:

Objectives: To enable the students to know about the fundamental concepts of Coloumb's law, Ohm's law, Kirchhoff's laws, electromagnetic induction and electrostatics and how they might be applied in real life. To understand the magnetic properties of materials in detail.

ELECTRICITY

UNIT-I (25 hrs)

ELECTROSTATICS

Coulomb's law – Electric field and electric intensity-Electrostatic potential-Electrostatic potential at a point due to charged conductor and charged sphere-Energy of a system of charges-Gauss's theorem and its applications- Mechanical force experienced by unit area of a charged sphere – Electrified soap bubble – Electrical images.

Capacitors: Capacity of a conductor- Energy of a charged conductor- Sharing of energy between two capacitors - Principle of a capacitor - Capacity of a spherical and cylindrical condensers- Capacitors in series and in parallel- Quadrant Electrometer-Capacity of aQuadrant Electrometer Electrolytic condenser –Guard ring condenser.

UNIT-II: (25 hrs)

CURRENT ELECTRICITY AND THERMOELECTRICITY

Electric current – Nernst theory of electrode potentials-Cells-Theory of voltaic cells-Dry cell-Atomic Battery-Electrical measurements-Definitions and units of Volt, electric current and Resistance -Ohm's law –Verification of Ohm's law– Resistances in series and parallel – Ammeters and voltmeters – Cells in parallel and series –Lorentz-Drude theory of electrical conduction and derivation for electrical conductivity -Kirchhoff's laws-Potentiometers-Comparison of emf of two cells.

Thermoelectricity- Seebeck effect–Laws of thermo emf- Peltiereffect – Peltier coefficient – Determination of Peltier coefficient (Caswell's method) – Thomson effect – Starling method -Thomson coefficient – Thermo electric power – Application of thermodynamics to Thermocouple – Thermoelectric diagrams and their uses.

UNIT- III: (25 hrs)

ELECTROMAGNETIC INDUCTION AND TRANSIENT CURRENTS

Faraday's laws – Lenz's law - Fleming's right hand rule – Self inductance – Self inductance of a long solenoid – Determination of self inductance by Rayleigh's method – Mutual inductance – Mutual inductance between two solenoids – Determination of mutual inductance.

Helmholtz Equations - Growth and decay of current in a circuit containing resistance and inductance. Growth and decay of charge in a circuit containing resistance and capacitor - growth and decay of charge in a LCR circuit – Moving coil Galvanometer – Moving coil ballistic galvanometer -Moving iron galvanometer – watt-Hour meter

MAGNETISM

UNIT- IV: (25 hrs)

MAGNETIC POTENTIAL AND MAGNETOMETERS

Magnetic potential – Potential and intensity at a point due to a bar magnet- Magnetic intensity at any point due to bar magnet - Magnetic potential at a point due to a magnetized sphere – Magnetic shell – Potential at a point due to a magnetic shell – Magnetometers – Deflection magnetometer-magnetic length of a magnet-Vibration magnetometer-Permeability – Susceptibility – Relation between μ and χ - Gauss theorem and its applications .

UNIT –V:(25 hrs)

MAGNETIC PROPERTIES OF MATERIAL AND EARTH'S MAGNETIC FIELD

Magnetic induction – Magnetization – Properties of dia, para and ferro magnetic materials – Anti ferro magnetism and ferri magnetism - Electron theory of magnetism – Langevin's theory of para magnetism - Weiss's theory of ferro magnetism – Cycle of magnetization and Hysterisis- Experiment to draw M-H curve (horizontal model) – Energy loss due to hysteresis.Earth as a magnetic sphere-Magnetic maps-Sun-spot activity- Geomagnetic prospecting

REFERENCES

1. Brijlal and Subramaniam, (1992). *Electricity and Magnetism*, Ratan Prakashan Educational & University Publishers,
2. R. Murugesan,(1998). *Electricity and Magnetism* , New Delhi, Sultan Chand & Sons,
3. Sehgal, Chopra and Sehgal,(1980). *Electricity and Magnetism*, New Delhi, Sultan Chand & Sons,
4. http://bookboon.com/en/physics-ebooks

EXTENSIBLE LEARNING PHYSICS –IV
(60 Hours)

SUBJECT CODE:

OBJECTIVES

- To enable the students to enhance their capability of understanding about the basics of electricity , magnetism, optical instruments and conventional sources of energy .
- To improve their Scientific and technical skills through activities.

Unit –I (12 hrs)
Electricity

Electric current – electric potential and potential difference – Ohm,s law – Resistance – resistance in series – resistors in parallel – Heating effect of electric current – applications – electric power - domestic electric circuits.

Activities and demonstrations

Demonstration of electric circuit using battery , switch and bulb – preparing the list of various symbols of commonly used electric components – Study of resistors in Series and parallel by connecting three or four resistors and measurement of voltage at various points of resistor ends –Preparing chart on home appliances power consumption and calculating monthly average electric bill charge.

Unit – II (12 hrs)
Magnetism

Magnetic field and field lines — Right hand thumb Rule - Magnetic field due to a current carrying conductor – circular loop – solenoid – Force on a current carrying ciondutor in a magnetic field – Electro magnetic induction – Electric motor – Generator.

Activities and demonstrations

Action of the magnetic compass placed near the circuit containing thick copper wire – observations and discussions on bar magnet near the iron fillings –producing pattern of concentric circles indicating magnetic field around a straigt conducting wire - preparation of electromagnet using nail , insulated copper wire and a battery .- chart preparation about the scientists who are contributed to electricity and magnetism.

Unit – III (12 hrs)
Ray optics – Mirrors

Reflectionof light – Image formation by spherical mirrors – ray diagram of images formed by spherical mirrors–images formed by concave and convex mirrors – Uses of concave and convex mirrors –Mirror formula and magnification

Activities and demonstrations

Testing the images on curved polished objects while it is moving farther and nearer (stainless steel bowl and spoon) – Preparing the table on size of an object viewing in plane mirror , covex mirror and concave mirror.

Unit – IV (12 hrs)

Ray optics : Lenses

Refraction of light – Refraction through a rectangular glass slab – Refractive index – Refraction by Spherical Lenses – image formation by lenses –Lense formula and magnification – power of a lens.

Activities and demonstrations

Observing the stick partly immersed in the bucket filled with water – write your experience while picking a coin placed at the bottom of the bucket filled wiht water by keeping eye to a side above water. Observing the line drawn on a paper and glass slab partly placed on it – focusing sunlight on a paper through convex lens – calculating approximate focal length of a covex lens by forming image on a wall.

Unit – V (12 hrs)

Sources of Energy : Non - Conventional energy

Solar Energy –Solar cells –Energy from the sea – Tidal energy – wave energy – Ocean thermal energy –Geo thermal energy – Nuclear energy – renewable source of energy – environmental consequences.

Activities and demonstrations

Construction of solar cooker using low cost material and observe the heating performance- Preparing chart on nuclear power plants in – group discussion on advantages and disadvantages of Ocean Thermal Energy and geo thermal energy.

REFERENCES

1. CRC Handbook of Physics & Chemistry, (1999). New York,CRS Press,
2. D. Halliday, R.Resnick and J.Walker,(2001). *Fundamentals of Physics*, New York, Wiley
3. D.Halliday, R.Resnick and K.S.Krane, (1994). Physics Vols I, II & II Extended , New York, Wiley
4. NCERT (NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING) text books for standard IX,X,New Delhi.
5. R P. Feynman, R B Leighton and M Sands, (1998). The Feynman Lectures on Physics, VoIs. I, II, and III, New Delhi, Narosa.
6. Tamilnadu Text Books for CBSE IX,X.
7. Tamilnadu Text Books for standard IX,X.
8. www.ncert.nic.in
9. https//www.practicalphysics.org
10. https://www.education.com>activity >physics
11. https://www.iop.org>education>itp>resources
12. https://www.nsf.gov>news>physics

CORE PRACTICAL - II
(60 Hours)

SUBJECT CODE:

(Any 12 Experiments

1. Metre bridge – Resistance and specific resistance.
2. Determination of 'M'–Tan C position.
3. Carey Foster bridge –R and P
4. Potentiometer – low range voltmeter calibration.
5. Potentiometer - low range ammeter calibration.
6. Potentiometer –Temperature coefficient R.
7. Figure of Merit – Ballistic galvanometer.
8. Field along the axis of the coil – Determination of B_H.
9. Sonometer – A.C frequency.
10. Junction diode characteristics.
11. Zener diode characteristics.
12. Construction of Half wave rectifier.
13. 12 – 0 – (-12) Dual IC regulated power supply
14. Verification of truth tables of AND, OR ,NOT ,NAND, NOR and EX-OR gates.
15. NAND as universal gate.
16. Transistor characteristics – CE mode.
17. OP-AMP – Adder and Subtractor.
18. OP-AMP – Inverting and Non inverting
19. OP-AMP - Sign changer and Scale changer

REFERENCES

1. S. Srinivasan, (2005).A Text Book of Practical physics, New Delhi, S. Sultan Chand publications.
2. R. Sasikumar, (2011). Practical Physics, New Delhi, PHI Learning Pvt. Ltd.
3. https//www.practicalphysics.org.

ALLIED CHEMISTRY - II

SUBJECT CODE:

(80 Hours)

UNIT- I Periodic Classification

History of periodic classification – IUPAC periodic table – IUPAC nomenclature for element, with atomic number more than 100 – Classification of elements in to s, p, d and f blocks. Atomic and ionic radii – variation along periods and groups. Ionisation energy – Electronegativity and electron affinity – factors influencing them – variation along periods and groups.

UNIT- II Chemical bonding

Chemical bonding – classification of molecules – types of bonds – ionic bond – factors influencing – lattice energy and Born-Haber cycle. Covalent bond – characteristic of covalent bond – Fajan's rules. Coordinate covalent bond. VSEPR Theory.

UNIT- III Corrosion

Corrosion – Definition – theories of corrosion – factors influencing corrosion – types of corrosion – corrosion fatigue – corrosion control.

UNIT- IV Polymers

Polymers – polymerisation – definition – degree of polymerisation. Polymer structure and nomenclature - types of polymerisation – mechanism of polymerisation – free radical – ionic and co-ordinaiton. Preparation, properties and uses of polyethylene, polyvinylchloride, polypropylene, Teflon, polyurethane, nylon and polyester resins.

UNIT- V Water and water treatment

Water quality parameters – hard and soft water – hardness of water – types of hardness – estimation of hardness by EDTA method –Boiler corrosion – water softening – external treatment – lime soda process and zeolite process –demineralisation process. Electro-osmasis – electrodyalysis.

REFERENCES

1. Bahl, B.S. and Arun Bahl, (2010), Advanced Organic Chemistry, New Delhi, S. Chand & Company Private Limited.
2. Puri, B.R. and Sharma, L.R, (2011), Principles of Physical Chemistry, Jalandhar, Vishal publishing company.
3. Ravikrishnan, A., (2007), Applied chemistry, Chennai, Sri Krishna Publication.
4. Krishnamurthy, N., Vallinayagam, P., Jeyasubramanian, K., (2001) Applied Chemistry, Delhi, Tata McGraw-Hill publishing company limited.
5. https://www.khanacademy.org/science/chemistry/chemical-reactions-stoichiome
6. https://www.wyzant.com/resources/lessons/science/chemistry/introduction_to_organic_chemistry
7. https://fenix.tecnico.ulisboa.pt/downloadFile/3779579580823/Chap-7_Fuels.pdf

ALLIED CHEMISTRY PRACTICALS

SUBJECT CODE:

(40 Hours)

Quantitative analysis:

1. Estimation of hydrochloric acid using sodium carbonate
2. Estimation of hydrochloric acid using link sodium hydroxide and standard oxalic acid
3. Estimation of Ferrous iron using link potassium permanganate and standard oxalic acid.
4. Estimation of oxalic acid using link potassium permanganate and standard ferrous ammonium sulphate.
5. Estimation of ferric iron using standard potassium dichromate and external indicator Potassium ferro cyanide.

Qualitative analysis:

Qualitative analysis of simple organic compounds containing any one functional group

Acids, aldehydes, ketones, diamide, amines, simple phenols and carbohydrates.

REFERENCES

1. Venkateswaran, V., Veeraswamy, R. and Kulandaivelu, A.R, (2006), Basic Principles of Practical Chemistry, New Delhi, Sultan Chand & Sons Private Limited.
2. https://en.wikipedia.org/wiki/Qualitative_inorganic_analysis
3. https://archive.org/stream/manuchemianalqual00newtrich#page/n19/mode/2up
4. https://www.britannica.com/science/qualitative-chemical-analysis.

CHEMISTRY

CORE PAPER- IV
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY - IV

SUBJECT CODE:

(120 Hours)

UNIT-I

Alcohols-general methods of preparation-industrial preparation of methanol and ethanol, properties of alcohols-hydrogen bonding in alcohols- distinction among primary, secondary and tertiary alcohols. Preparation, properties and uses of ethylene glycol and glycerol. Preparation, reactions and uses of methyl mercaptan.

UNIT-II

Need for the second law of thermodynamics-various statements, cyclic process, Carnot's cycle. Efficiency of a heat engine, thermodynamic scale of temperature. Entropy – definition, physical significance, entropy changes in reversible and irreversible processes. Work and free energy functions, variation of free energy changes with temperature and pressure. Maxwell's relations. Gibbs – Helmholtz equations. Third law of thermodynamics – statement and need for the third law.

UNIT-III

The concept of chemical potential and its significance. Equilibrium constants Kp and Kc-relation between them. Temperature dependence of equilibrium constants.van't-Hoff equation, Le Chatelier's principle-statement and applications. Colligative properties-thermodynamic derivations of molar depression in freezing point, elevation of boiling point, their usefulness in determining molar masses.Osmotic pressure and its measurement-principle of reverse osmosis.

UNIT-IV

f-block elements-position in the periodic table, general characteristics of lanthanides and actinides- lanthanide contraction and its consequences-occurrence, oxidation states, magnetic properties and colour. Separation of lanthanides by fractional crystallization method and ion exchange method.Extraction and uses of thorium and uranium.

UNIT-V

Composition of nucleus, nuclear forces (meson theory)-nuclear stability- mass defect, binding energy, packing fraction, n/p ratio and magic numbers. Isotopes, isobars, isotones and isomers-basic idea only-detection of isotopes by Aston's mass spectrograph method.
Radioactive disintegration-modes of decay-rate of disintegration.Half-life period and average life.Nuclear fission-atom bomb and nuclear fusion-hydrogen bomb and stellar energy, uses of radioactive isotopes in medicine, analytical chemistry and carbon dating.

REFERENCES

1. Puri, B.R. and. Sharma, L.R, (2011), Principles of Inorganic Chemistry, Delhi, Milestone publishers & distributors.
2. Puri, B.R. and Sharma, L.R, (2011), Principles of Physical Chemistry, Jalandhar, Vishal publishing company.
3. Madan, R.D., (2008), Modern Inorganic chemistry New Delhi, S. Chand & Company Private Limited.

4. Bahl, B.S. and Arun Bahl, (2010), Advanced Organic Chemistry, New Delhi, S. Chand & Company Private Limited.
5. http://www.askiitians.com/revision-notes/chemistry/transition-elements/
6. http://slideplayer.com/slide/4637309/
7. http://www.askiitians.com/iit-jee-solutions-colligative-properties/colligative-properties-and-determination-of-molar-mass/
8. http://www.askiitians.com/iit-jee-chemistry/organic-chemistry/general-methods-of-preparation-of-alcohols.aspx

CHEMISTRY FOR SCHOOL EDUCATION - PAPER – IV

SUBJECT CODE:

(60 Hours)

UNIT- I Chemical Reactions and Equations

Chemical reaction – activity based learning. Chemical equations – writing and balancing – chart preparation. Types of chemical reactions – activity based learning. Effects of oxidation in everyday life.

UNIT – II Acid, Base and salts

Chemical properties of acids and bases – activity based learning. pH scale – importance of pH in everyday life. Family of salts, pH of salts – activity based learning. Preparation and uses of sodium chloride, sodium hydroxide, bleaching powder, backing soda and washing soda. Water of crystallisation – plaster of paris – uses. Demonstration of soda ash fire extinguisher application.

UNIT – III Periodic classification

Dobereiner's triads, Newland's law of octaves, Mendeleev's periodic table – achievements, limitations. Modern periodic table – activity based learning. Match making chart preparation to identity the elements and position.

UNIT – IV Metals and non-metals

Physical and chemical properties of metals and non-metals – activity based learning. Reactivity series – chart preparation. Reaction of metals with non-metals. Properties of ionic compounds – activity based learning. Demonstration experiment showing conductivity of salt solution. Extraction of metals – flow chart preparation. Refining of metals – demonstration experiments involving refining of copper metal. Corrosion and its prevention – activity based learning.

UNIT – V Carbon and its compounds

Covalent bonding in hydrogen, oxygen, nitrogen and methane molecules. Allotropes of Carbon. Saturated and unsaturated compounds. Differentiating the structure of cyclohexane and benzene. Functional groups. Homologous series – activity based learning. Nomenclature of carbon compounds – chart making. Chemical properties of carbon compounds – activity based learning. Properties of ethanol and ethanoic acid activity based learning. Soaps and detergents – difference, cleaning action – activity based learning. Model making for simple organic compounds like, methane, ethane, ethanol, ethanoic acid and benzene.

REFERENCES

1. 10^{th} Standard science books, New Delhi, NCERT (National Council of Educational Research and Training).
2. http://ncert.nic.in/textbook/textbook.htm?iesc1=0-15
3. http://chemistrynoteslecture.com/Units%201-12%20High%20School%20Chemistry.html
4. https://byjus.com/ncert-solutions-class-9-science/

CORE PRACTICAL – II

SUBJECT CODE:

(120 Hours)

A. VOLUMETRIC ANALYSIS

Acidimetry and Alkalimetry

1. Estimation of sodium carbonate using link hydrochloric acid and standard sodium carbonate.
2. Estimation of hydrochloric acid using link sodium hydroxide and standard oxalic acid.
3. Estimation of carbonate and bicarbonate in a mixture by Warder's method.

Permanganometry

4. Estimation of ferrous iron using link potassium permanganate and standard oxalic acid.
5. Estimation of oxalic acid using link potassium permanganate and standard ferrous ammonium sulphate.
6. Estimation of calcium using link potassium permanganate and standard oxalic acid.

Dichrometry

7. Estimation of ferric iron using standard potassium dichromate and external indicator potassium ferricyanide.
8. Estimation of ferric iron using standard potassium dichromate and internal indicator diphenylamine.
9. Estimation of potassium dichromate using link sodium thiosulphate and standard potassium dichromate.

Iodometry and iodimetry

10. Estimation of copper using link sodium thiosulphate and standard potassium dichromate.

Argentometry(demonstration)

12. Estimation of chloride using link silver nitrate and standard sodium chloride.

EDTA Titration

13. Estimation of hardness of water by EDTA method.

B. ORGANIC CHEMISTRY PRACTICALS

Qualitative analysis of monofunctional groups

Organic compounds containing any one of the following functional groups/compounds may be given for analysis:

Acids, esters, aldehydes, ketones, nitrocompounds, anilides, amines, carbohydrates, amides, phenols, naphthols, dihydric phenols, aromatic nuclear halogen compounds and aromatic side chain halogen compounds, urea and thiourea.

Organic Preparations

Preparation of acetanilide from aniline, benzanilide from aniline, benzoic acid from ethylbenzoate, parabromoacetanilide from acetanilide, aspirin, nitrobenzene, glucosazone and salicylic acid from methyl salicylate.

REFERENCES

1. Venkateswaran, V., Veeraswamy, R. and Kulandaivelu, A.R, (2006), Basic Principles of Practical Chemistry, New Delhi, Sultan Chand & Sons Private Limited.
2. Thomas, A., (1981), Practical Chemistry, Cannanore, Scientific Book Centre.
3. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html

4. https://in.okfn.org/files/2013/07/An-Introductory-Course-of-Quantitative-Chemical-Analysis.pdf
5. https://www.thinkiit.in/iit-qrp/english/theory/chemistry/organic/practical-organic-chemistry/
6. https://www.bookrix.com/book.html?bookID=deepakpant1_1276415412.1891009808#0,558,23526

ALLIED PHYSICS – II

SUBJECT CODE:

(80 Hours)

UNIT - I (16 Hrs)

Electricity and magnetism

Krichoff's Law's and their applications to Wheatstone's network - Potentiometer- Internal resistance of a cell and thermo emf measurement- – Capacitor- energy of charged capacitors – Field along the axis of solenoid – tangent galvanometer – Moving coil galvanometer – self induction – mutual induction – Circuit control and protective devices – types of switches – fuses – circuit brakers.

UNIT - II (16 Hrs)

Atomic Physics

Atom models – Vector atom Models – Pauli's exclusion Principle – various quantum numbers and quantization of orbits. X-rays – Continuous and Characteristic X-rays – Mosley's Law and its importance .

UNIT - III (16 Hrs)

Nuclear Physics

Nucleus – Nuclear Size – Charge – Mass and Spin – Liquid drop model – Binding energy –Radio activity – Half life period – mean life period -Nuclear Radiations and their properties,Nuclear fission and fusion – atom bomb – Thermo nuclear reactions – Nuclear reactor

UNIT - IV (16 Hrs)

Quantum Mechanics

Principle of Uncertainty – wave function – Schrödinger's one dimensional equation – Eigen function and Eigen values – Application -Particle in a box — one dimensional potential well

UNIT - V (16 Hrs)

Digital Electronics

Decimal – Binary – Octal and Hexa Decimal number systems and their Mutual Conversions -1's and2's complement of a Binary number and Binary arithmetic (Addition, ubtraction, Multiplication and Division) – Binary Subraction by 1's and 2's complement methods – Basic logic gates – AND, OR, NOT, NOR, NAND and EXOR Gates – NAND and NOR as universal building gates – Boolean Algebra – Laws of Boolean Algebra – DE Morgan's Theorems – Their verifications using truth tables.

REFERENCES

1. 1 Properties of matter and sound – R.Murugesan , S.Chand & Co. Delhi.
2. Sound – Saigal – S.Chand & Co. Delhi.
3. Heat and Thermodynamics – Brijlal and Subramaniam , S.Chand & Co. Delhi.
4. Optics – Brijlal and Subramaniam, S.Chand & Co. Delhi.
5. Magnetism and Electricity – Khare and Srivastava – Atma Ram and Sons – New Delhi.
6. Modern Physics – Murughesan – S.Chand and Co.
7. Hand Book of Electronics – Gupta and Kumar – Pragati Prakasan. Meerut.

ALLIED PHYSICS PRACTICAL
(40 Hours)

SUBJECT CODE:

1. Measurements of length (or diameter) using Vernier calipers, Screw gauge and Travelling microscope
2. Young's Modulus - Non uniform bending – Pin and Microscope Method
3. Young's Modulus - uniform bending
4. Compound pendulum
5. Rigidity modulus – Torsional pendulum
6. Coefficient of Viscosity of Liquid using graduated burette.
7. Specific heat capacity of liquid by Cooling Method.
8. Lee's Disc – Thermal Conductivity of Bad Conductor.
9. Spectrometer – Grating – Normal incidence method.
10. Spectrometer – Refractive index of Solid Prism (A,D and μ)
11. Newton's Rings – Radius of curvature of a convex lens
12. Sonometer – Verification of Three laws.
13. Meter Bridge – Verification of Resistance in Series and Parallel.
14. Moment of a magnet – Tan 'C' position
15. Characteristics of a junction diode
16. Construction of a full wave rectifier.
17. AND, OR and NOT logic gates – verification of truth table using Discrete components.
18. Potentiometer – Calibration of low range ammeter
19. Potentiometer – Calibration of voltmeter
20. NAND as Universal gate.

REFERENCES

1. A textbook of practical Physics – M.N. Srinivasan and others – Sultan Chand & Sons, New Delhi.
2. Practical Physics – A. Dhana Lakshmi and K.R. Paramasivam – Apsara.

BOTANY

CORE PAPER - IV
TAXONOMY OF ANGIOSPERSMS AND ECONOMIC BOTANY
SUBJECT CODE:

(120 Hours)

UNIT I

Principles of Taxonomy, Taxonomy and its importance. Herbarium –preparation and maintenance. Binomial nomenclature- ICN- Author citation, Key preparation, Taxonomic hierarchy and its meaning, major and minor categories (approaches to classification-Natural, Modern-their nature and limitations) systems of classifications Artificial- Linneus, Natural-Bentham and Hooker, modern-Cronquist (only outline of classification), Chemotaxonomy.

UNIT II

Detailed study of the characters and plants of economic importance of the following families Annonaceae, Zygophyllaceae, Fabaceae, Caesalpiniaceae, Mimosaceae, Cucurbitaceaeand `Apiaceae

UNIT-III

Detailed study of the characters and plants of economic importance of the following families Asteraceae, Sapotaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Moraceae, Orchidaceae, Liliaceae and Poaceae.

UNIT-IV

Source and processing of Economically useful products of the following:1)Rice, 2)Black gram, 3)Sugarcane, 4)Coffee, 5)White pepper, 6)Mango & 7)Aloe.

UNIT V

Pharmacognestic values of the following plant parts with respect to Habit, Habitat, Active principles, Actions ,& Uses: 1)Roots 2)Underground stems 3)Barks 4)Leaves 5)Galls 6)Fruits 7)Seeds .

REFERENCES

1. Naik, V.K., Principles of Plant Taxonomy, IBH Oxford.
2. Vasishta, P.C., 1994, Taxonomy of Angiosperms R.S. Chand & Company
3. Verma, B.K., Introduction to Taxonomy of Angiosperms (2011) PHI Learning Pvt.Ltd. N.Delhi.
4. Sharma, O.P., 1993, Plant Taxonomy, Tata McGraw Hill.
5. Chopra, G.L., 2004, Angiosperms, Pradeep Publications, Jalandar.
6. Pandey, B.P., Economic Botany, S.Chand& Company, New Delhi.
7. Sambamurthy, A text Book of Economic Botany, Wiley Eastern Pvt.Ltd. 8. Saxena, N.B., and Sabena's., 7th Edition (2010), PragatiPrakashan, Meerut.
8. Lawrence, G. H.M., 1969, Taxonomy of vascular Plants Oxford & IBH Publishing Co.N.Delhi.

SEMESTER - IV

9. Rendle, R.B., The Classification of flowering plants, Vol. I, II &III, Oxford-Clarendon.
10. Gamble, J.S., Flora of Presidency of Madras, Vols. I, II & III (1986) Bishen Singh Mahendra Pal Singh, Dehra Dun.
11. Albert F.Hill, Economic Botany, Tata McGraw Hill Publishing Company.

BIOBASICS - IV – BOTANY

SUBJECT CODE:

(60 Hours)

UNIT - I

Seed- morphology.Dispersal of fruits and seeds- dispersal of wind, water, animal

UNIT - II

Vegetative reproduction- different methods of propagation- cutting, layering, underground stem, aerial branches, adventitious buds.

UNIT - III

Grafting – approach grafting, true grafting, bud grafting

UNIT - IV

Germination- conditions governing germinations

UNIT - V

Germination of exalbuminous seeds with epigeal cotyledons, germination of aluminous seeds, Germination of monocotyledonous seeds.

REFERENCES

1. R.V. NarayanaSwamy, K. N. Rao, 2009. Outlines of Botany. V.Subramanian Pvt. Limited, Chennai.

2. B.P. Pandey, 2011. Botany for Degree students, S.Chand&Co.Ltd., New Delhi .

3. B.P Pandey, 2010. Modern Practical Botany vol I, vol II, vol III, S.Chand& Company Ltd.New Delhi.

CORE PRACTICAL – II

SUBJECT CODE

(60 Hours)

PLANT ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

1. Cell types and tissues
2. Non-living inclusions : starch grains, cystoliths, raphides and aleurone grains
3. Primary structure of stem, root and leaf-dicot and monocot
4. Stomatal types-anomocytic, anisocytic, paracytic, diacytic and grass type
5. Secondary structure of dicot stem and root
6. Anomalous secondary structure- Bougainvillea, Bignonia, Nyctanthesand Dracaena
7. Identification of wood based on either RLS or TLS
8. Identification of C.S. of anther, embryosac, monocot and dicot embryo
9. Identification of placentation types
10. Identification of various stages of dicot embryo

TAXONOMY OF ANGIOSPERSMS AND ECONOMIC BOTANY

1. Morphological identification of Plant Parts and their modifications.
2. Dissection of floral parts of plants belonging to the families.
3. Identify and comment on use of plants.
4. Field trips (Minimum 5 Days) to places within or outside the state under the guidance of teachers to study plants in their natural habitats.
5. Preparation and submission of 10 Herbarium sheets.

REFERENCES

1. Tayal, M.S., Plant Anatomy, 3rd edition, (2012), Rastogi Publications, Meerut.
2. Pandey, B.P., 1978, Plant Anatomy, S.Chand& Co., New Delhi,
3. Vasishta, P.C., A Text Book of Plant Anatomy, Pradeep Publications, Jullunder.
4. Bhojwani, S.S. and Bhatnagar, S.P., 1978, The embryology of Angiosperms, publishing House, N.Delhi.
5. Dwinedi, J.N., 1988, Embryology of Angiosperms, Rastogi and Co., Meerut.
6. Singh,V.,Pande,P.C.,Jain,D.K.,Embryology of Angiosperms,2010-11,Rastogi Publications, Meerut.
7. Esau, K., 1975, Plant Anatomy, Wiley Eastern Private Ltd., New Delhi.
8. Fahn, A., 1974, Plant Anatomy, Pergoman Press, Oxford.
9. Maheswari, P., 1971, An introduction to Embryology of Angiosperms, Tata McGraw Hill Publishing Co.Ltd, New Delhi. 1
10. Swamy,B.G.L. and Krishnamurthy,k.V., From Flower to Fruit, Tata McGraw Hill Publishing Company Ltd.,New Delhi.
11. Naik, V.K., Principles of Plant Taxonomy, IBH Oxford.
12. Vasishta, P.C., 1994, Taxonomy of Angiosperms R.S. Chand & Company
13. Verma, B.K., Introduction to Taxonomy of Angiosperms (2011) PHI Learning Pvt.Ltd. N.Delhi.
14. Sharma, O.P., 1993, Plant Taxonomy, Tata McGraw Hill.
15. Chopra, G.L., 2004, Angiosperms, Pradeep Publications, Jalandar.
16. Pandey, B.P., Economic Botany, S.Chand& Company, New Delhi.

17. Sambamurthy, A text Book of Economic Botany, Wiley Eastern Pvt.Ltd. 8. Saxena, N.B., and Sabena's., 7th Edition (2010), PragatiPrakashan, Meerut.
18. Lawrence, G. H.M., 1969, Taxonomy of vascular Plants Oxford & IBH Publishing Co.N.Delhi.
19. Rendle, R.B., The Classification of flowering plants, Vol. I, II &III, Oxford-Clarendon.
20. Gamble, J.S., Flora of Presidency of Madras, Vols. I, II & III (1986) Bishen Singh Mahendra Pal Singh, Dehra Dun.
21. Albert F.Hill, Economic Botany, Tata McGraw Hill Publishing Company.

ALLIED CHEMISTRY - II

SUBJECT CODE:

(80 Hours)

UNIT- I Periodic Classification

History of periodic classification – IUPAC periodic table – IUPAC nomenclature for element, with atomic number more than 100 – Classification of elements in to s, p, d and f blocks. Atomic and ionic radii – variation along periods and groups. Ionisation energy – Electronegativity and electron affinity – factors influencing them – variation along periods and groups.

UNIT- II Chemical bonding

Chemical bonding – classification of molecules – types of bonds – ionic bond – factors influencing – lattice energy and Born-Haber cycle. Covalent bond – characteristic of covalent bond – Fajan's rules. Coordinate covalent bond. VSEPR Theory.

UNIT- III Corrosion

Corrosion – Definition – theories of corrosion – factors influencing corrosion – types of corrosion – corrosion fatigue – corrosion control.

UNIT- IV Polymers

Polymers – polymerisation – definition – degree of polymerisation. Polymer structure and nomenclature - types of polymerisation – mechanism of polymerisation – free radical – ionic and co-ordinaiton. Preparation, properties and uses of polyethylene, polyvinylchloride, polypropylene, Teflon, polyurethane, nylon and polyester resins.

UNIT- V Water and water treatment

Water quality parameters – hard and soft water – hardness of water – types of hardness – estimation of hardness by EDTA method –Boiler corrosion – water softening – external treatment – lime soda process and zeolite process –demineralisation process. Electro-osmasis – electrodyalysis.

REFERENCES

1. B. S. Bahl and ArunBahl, Advanced Organic Chemistry,S.Chand&Company, Edn. (2010).
2. B. R.Puri and L. R. Sharma, Principles of Physical Chemistry, Vishal Publication, Edn. 44 (2011).
3. A. Ravikrishnan, Applied chemistry, Sri Krishna Publication, Edn (2007).
4. N. Krishnamurthy, P. Vallinayagam, K. Jeyasubramanian, Applied Chemistry, Tata McGraw-Hill publishing company limited, Second edition (2001).

ALLIED CHEMISTRY PRACTICALS

SUBJECT CODE:

(40 Hours)

Quantitative analysis:

1. Estimation of hydrochloric acid using sodium carbonate
2. Estimation of hydrochloric acid using link sodium hydroxide and standard oxalic acid
3. Estimation of Ferrous iron using link potassium permanganate and standard oxalic acid.
4. Estimation of oxalic acid using link potassium permanganate and standard ferrous ammonium sulphate.
5. Estimation of ferric iron using standard potassium dichromate and external indicator Potassiumferrocyanide.

Qualitative analysis:

Qualitative analysis of simple organic compounds containing any one functional group

Acids, aldehydes, ketones, diamide, amines, simple phenols and carbohydrates.

REFERENCES

1. V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, (2006). *Basic Principles of Practical Chemistry*, Sultan Chand & sons.

ZOOLOGY
CORE PAPER - IV
GENETICS

SUBJECT CODE:

(120 Hours)

UNIT-I

Introduction to Genetics - Basis of Mendelian Inheritance and Mendelian laws. Incomplete dominance and co-dominance, Pleiotropism. Interaction of genes: Allelic and non allelic interactions, supplementary genes, complementary genes. Polygenic (quantitative) inheritance.

UNIT-II

Multiple alleles: Definition, characteristics and examples: coat colour in rabbits, Rh factor and erythroblastosis foetalis; Blood Groups and their Inheritance in Human ; Linkage and Crossing Over: Complete and Incomplete Linkage, Crossing Over types, Mechanisms, Mapping of Chromosomes.

UNIT-III

Sex determination: sex chromosomes; X and Y male heterogametic and female heterogametic chromosomes. Mechanism of sex determinations [XX-XO, XX-XY, ZZ-ZW types]; Sex-linked, sex-influenced and sex-limited characters – Pedigree analysis.

UNIT-IV

Mutation: Definition – kinds of mutations – gene mutations – molecular basis of gene mutations – substitution and frame shift mutations – mechanisms – factors influencing mutations – induced mutations – mutagens. Chromosome mutations – numerical and structural changes. Numerical changes: euploidy and aneupoloidy. Structural changes: deletion, duplication, insertion, inversion, translocation.

UNIT-V

Human Genetics - Normal chromosome component in human beings, classification and grouping of human chromosomes - Chromosomal anomalies and disorders: Down's syndrome, Turner's and Klinefelter's syndromes, Gene mutations- albinism, PKU, alkaptonuria

REFERENCES

1. Verma, P.S. and V.K. Agarwal, 1995. Genetics, 8th edition, New Delhi ,S. Chand & Co
2. Goodenough, V., 1978. Genetics, 2nd ed., New York Holt, Rinchart and Winston
3. Watson, J.D. and W.A. Benjamin, 1976. Molecular Biology of the Gene, New York, Benjamin Co. Inc.,
4. Winchester, 1967. Genetics, New Delhi, Oxford IBH Publications
5. P.S. Verma & V.K. Agarwal , 1999 . Concept of Genetics, Human genetics & Eugenics — New Delhi , S. Chand & Company
6. http://web.iitd.ac.in/~amittal/SBL101_Essentials_of_Genetics.pdf
7. http://gsi.semmelweis.hu/files/ebook/Genetics%20genomics_en.pdf
8. http://www.agrimoon.com/wp-content/uploads/Principle-of-Genetics.pdf

BASIC ZOOLOGY – IV
(60 Hours)

SUBJECT CODE:

UNIT-I Human Physiology

Alimentary canal and digestive glands, role of digestive enzymes and gastrointestinal hormones; Peristalsis; disorders - indigestion, constipation, vomiting, jaundice, diarrhoea.

Respiratory system in humans; mechanism of breathin ; disorders – Asthma, emphysema, occupational respiratory disorders.

Composition of blood, blood groups, coagulation of blood; Structure of human heart and blood vessels; ; double circulation; disorders - hypertension, coronary artery disease, angina pectoris, heart failure.

Human excretory system - structure and function; urine formation ; disorders - uraemia, renal failure, renal calculi, nephritis; dialysis and artificial kidney.

UNIT-II Human Physiology

Muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal system - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

Central nervous system; peripheral nervous system and visceral nervous system; generation and conduction of nerve impulse; sense organs

Human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, gonads; disorders; dwarfism, acromegaly, cretinism, goiter, diabetes, Addision's disease.

Male and female reproductive systems; Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control – Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies - IVF, ZIFT, GIFT

UNIT-III Human Health and Diseases

Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology - vaccines; Cancer, HIV and AIDs; Adolescene, drug and alcholol abuse.

UNIT-IV Microbes in Human Welfare

In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers. Antibiotics; production and judicious use.

UNIT-V Biotechnology and its Application

Recombinant DNA Technology : Application of Biotechnology in health : Human insulin and vaccine production, gene therapy; Genetically modified organisms-Bt crops; Transgenic Animals; biosafety issues, biopiracy and patents.

REFERENCES

1. . NCERT , CBSE & TN TEXT BOOKS OF CLASS 9, 10, 11, 12
2. Verma, P.S. 2004 Cell biology , Genetics , molecular biology , Evolution and Ecology, New Delhi , S.Chand & Co.
3. V.K. Agarwal, 1995. Cell and Molecular Biology, 8th edition, New Delhi , S.Chand & Co
4. NCERT , CBSE , TN TEXT BOOKS OF CLASS 9, 10, 11, 12

SEMESTER - IV

5. John Hall 2015, Guyton & Hall Text book of Medical Physiology , USA, Saunders
6. R.C.Dubey 1993 Text book of Biotechnology , New Delhi , S.Chand publishing Co.
7. R.C.Dubey & D.K.Maheswari 2013, Text book of Microbiology , New Delhi , S.Chand publishing Co.
8. https://medicforyou.in/satyanarayana-ebook-download-free-pdf
9. http://www.textbooksonline.tn.nic.in/books/12/std12-biochem-em.pdf
10. https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf.
11. http://www.freebookcentre.net/medical_books_download/Human-Physiology-Lecture-Notes.html
12. https://moorthibio.weebly.com/uploads/4/7/5/6/4756207/ebooksclub.org__biotechnology.pdf
13. https://archive.org/details/ost-biology-microbiology

CORE PRACTICAL - II

SUBJECT CODE:

(60 Hours)

CELL BIOLOGY

1. Micrometry – Use of Microscopes, Camera Lucida, Stage and Ocular Micrometer.
2. Blood smear preparation – Differential Count of WBC.
3. Counting of RBC and WBC using Haemocytometer
4. Mounting of Buccal epithelium and observing living cells using vital staining.
5. Mitosis in Onion root tip squash
6. Study of prepared slides of histology

a. Columnar epithelium	b. Ciliated epithelium	c. Areolar Connective tissue
d. Cartilage T.S.	e. Bone T.S.	f. Cardiac tissue
g. Striated muscle	h. Non striated muscle	i. Nervous tissue
j. Ovary T.S.	k. Testis T.S.	

GENETICS

7. Mendelian crosses – Examples for Incomplete dominance and co-dominance, lethal genes, supplementary genes, complementary genes, epistasis, polygenic (quantitative) inheritance, skin colour in man.
8. Study of the biology of Drosophila.
9. Observation of Common mutants of Drosophila
10. Human blood grouping.
11. Normal karyotype in human beings,
12. Chromosomal anomalies and disorders: Down's, Turner's and Klinefelter's syndromes
13. Gene mutations: autosomal mutations like albinism, PKU, alkaptonuria, sickle cell anaemia, thalassemia, sex chromosomal mutations: haemophilia, Polygenic traits: cleft palate / lip

REFERENCES

1. Verma, P.S. and V.K. Agarwal, 1995. Genetics, 8th edition, New Delhi ,S. Chand & Co
2. Goodenough, V., 1978. Genetics, 2nd ed., New York Holt, Rinchart and Winston
3. Watson, J.D. and W.A. Benjamin, 1976. Molecular Biology of the Gene, New York, Benjamin Co. Inc.,
4. Winchester, 1967. Genetics, New Delhi, Oxford IBH Publications
5. P.S. Verma & V.K. Agarwal , 1999 . Concept of Genetics, Human genetics & Eugenics — New Delhi , S. Chand & Company
6. http://web.iitd.ac.in/~amittal/SBL101_Essentials_of_Genetics.pdf
7. http://gsi.semmelweis.hu/files/ebook/Genetics%20genomics_en.pdf
8. http://www.agrimoon.com/wp-content/uploads/Principle-of-Genetics.pdf

ALLIED CHEMISTRY - II

SUBJECT CODE:

(80 Hours)

UNIT- I Periodic Classification

History of periodic classification – IUPAC periodic table – IUPAC nomenclature for element, with atomic number more than 100 – Classification of elements in to s, p, d and f blocks. Atomic and ionic radii – variation along periods and groups. Ionisation energy – Electronegativity and electron affinity – factors influencing them – variation along periods and groups.

UNIT- II Chemical bonding

Chemical bonding – classification of molecules – types of bonds – ionic bond – factors influencing – lattice energy and Born-Haber cycle. Covalent bond – characteristic of covalent bond – Fajan's rules. Coordinate covalent bond. VSEPR Theory.

UNIT- III Corrosion

Corrosion – Definition – theories of corrosion – factors influencing corrosion – types of corrosion – corrosion fatigue – corrosion control.

UNIT- IV Polymers

Polymers – polymerisation – definition – degree of polymerisation. Polymer structure and nomenclature - types of polymerisation – mechanism of polymerisation – free radical – ionic and co-ordinaiton. Preparation, properties and uses of polyethylene, polyvinylchloride, polypropylene, Teflon, polyurethane, nylon and polyester resins.

UNIT- V Water and water treatment

Water quality parameters – hard and soft water – hardness of water – types of hardness – estimation of hardness by EDTA method –Boiler corrosion – water softening – external treatment – lime soda process and zeolite process –demineralisation process. Electro-osmasis – electrodyalysis.

REFERENCES

1. 1 B. S. Bahl and ArunBahl, Advanced Organic Chemistry,S.Chand&Company, Edn. (2010).
2. B. R.Puri and L. R. Sharma, Principles of Physical Chemistry, Vishal Publication, Edn. 44 (2011).
3. Ravikrishnan, Applied chemistry, Sri Krishna Publication, Edn (2007).
4. N. Krishnamurthy, P. Vallinayagam, K. Jeyasubramanian, Applied Chemistry, Tata McGraw-Hill publishing company limited, Second edition (2001).

ALLIED CHEMISTRY PRACTICALS

SUBJECT CODE:

(40 Hours)

Quantitative analysis:

1. Estimation of hydrochloric acid using sodium carbonate
2. Estimation of hydrochloric acid using link sodium hydroxide and standard oxalic acid
3. Estimation of Ferrous iron using link potassium permanganate and standard oxalic acid.
4. Estimation of oxalic acid using link potassium permanganate and standard ferrous ammonium sulphate.
5. Estimation of ferric iron using standard potassium dichromate and external indicator Potassium ferrocyanide.

Qualitative analysis:

Qualitative analysis of simple organic compounds containing any one functional group

Acids, aldehydes, ketones, diamide, amines, simple phenols and carbohydrates.

REFERENCES

1. V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand & sons (2006).

EDUCATION

CONTEMPORARY INDIA AND EDUCATION - PART II
(60 Hours)

SUBJECT CODE:

OBJECTIVES

At the end of the course, the student-teachers will be able to:

1. develop an understanding of the nature of social diversity and the educational demands of the diverse communities
2. explain the salient features of Indian constitutional values on education
3. analyse the causes for inequality, discrimination and marginalisation in education
4. develop an understanding of the educational policies and programmes during the pre-independent and post-independent periods
5. examine the issues of language policy in education
6. develop an understanding on the emerging trends in education.

Unit - VI Policy frameworks on education: Post-independent India

Major recommendations of Kothari Commission (1964-1966) - Iswar Bhai Patel Committee (1977)- Malcom Adiseshiah Committee (1978)- New Education Policy (1986) - Programme of Action (1992)- Sachar Committee (2005) - Salient features of National Curriculum Framework (2005)- National Knowledge Commission (2005).

***Suggested instructional approaches/methods*:**

i. Student seminar/ Teacher talk on the major recommendations of different Education Committees/Commissions.
ii. Report presentation based on the group discussion/student seminar on the salient fractures of National Curriculum Framework (2005) and National Knowledge Commission - 2005

Unit - VII Educational planning and financing

Five year plans: Educational policy making and budgeting - Funding systems of education: Public, fees, students' loans, education cess and external aids.

***Suggested instructional approaches/methods*:**

i. Invited talk/teacher talk on the Indian educational funding systems and its implications.
ii. Report presentation based on student seminar/ brainstorming session suggesting alternative funding systems in education.

Unit - VIII Language policy in education

Language policy during the pre-independent and post-independent India - Language policy as specified in Indian Constitution - Views of great thinkers on medium of instruction: Views of great thinkers-Tagore, Gandhi and Vivekananda.

***Suggested instructional approaches/methods*:**

i. Report presentation based on the student seminar on the advantages and disadvantages of learning through mother tongue in relation to great education thinkers.

ii. Teacher talk/student seminar on the advantages and disadvantages of the three language formula.

Unit - IX Midday meal scheme as a socialisation process

Objectives of midday meal scheme – Benefits of midday meal scheme on education - Midday meal scheme as a socialization process with special reference to Tamil Nadu.

***Suggested instructional approaches/methods*:**

i. Report presentation based on the field study on the impact of midday meal scheme in rural area.
ii. Report presentation based on the debate: "Midday meal scheme is an effective tool for socialisation of children".

Unit - X Emerging trends in education

Impact of globalization, liberalization and privatization on education - Life-long learning and on-line education.

***Suggested instructional approaches/methods*:**

i. Invited talk/teacher talk on the impact of globalization, liberalization and privatization on education.
ii. Invited talk/teacher talk on the importance of life-long learning.

Tasks and Assignments:

1. Prepare a report based on the interaction/interview with legal expert(s) for the effective implementation of constitutional provisions to eliminate inequality, discrimination and marginalisation in education.
2. Write a detailed report on the five year plans implications of universalisation of education.

REFERENCES

1. Freire, Paulo. (2014). *Pedagogy of the oppressed*. New Delhi: Bloomsburry Publishing.
2. Ghosh, S.C. (2007). *History of education in India*. The University of Michigan: Rawat Publications.
3. Government of India.(2007). *National Knowledge Commission Report*. New Delhi.
4. Kumar, K. (2014). *Politics of education in colonial India*. New Delhi: Routledge.
5. Naik, J.P., Andrew, Vereker., & Nurullah, S. (2000). *A student's history of education in India (1800-1973)*.UK: Macmillan.
6. National Council for Educational Research and Training. (2005). *National curriculum framework*. New Delhi: NCERT.
7. Sedwal, M. & Kamat, S. (2008). *Education and social equity: With a special focus on scheduled castes and tribes in elementary education*. New Delhi: NUEPA.
8. http://mhrd.gov.in/sites/upload_files/mhrd/files/rte.pdf
9. http://shodhganga.inflibnet.ac.in/bitstream/10603/1918/8/08_chapter3.pdf
10. http://shodhganga.inflibnet.ac.in/bitstream/10603/4244/11/11_chapter%202.pdf

EPC 2: DRAMA AND ARTS IN EDUCATION
(60 Hours)

SUBJECT CODE:

The aim of this course is to enhance the professional capacities of a student-teacher, specifically his/ her creativities and aesthetic sensibilities.

OBJECTIVES To enable the student-teachers:

1. To use the techniques of art, music and drama for enhancing teaching and learning.
2. To use art, music and drama for enhancing one's self, expression and creativity.
3. To identify and recognize the experts in art, music and drama in the community and involve them for enhancing of teaching-learning process.

How to use art, music and drama in Education.

The teachers in Colleges of Education should:

1. With fine arts experts, engage the student-teachers in making a work of art/a drawing/a sketch/a sculpture/a statue relating to school subjects, in doing an oil painting/a line drawing/ a rough sketch, in painting a picture/landscape/mural/in oils/in water colours/ draw a picture /a protract /a cartoon / a line / a figure / a human form/ in charcoal /in ink.
2. Engage the student-teachers in visiting art galleries /art exhibitions and cultural festivals
3. Encourage the student-teachers to understand local culture and art forms and interpret art works, movies and other media.
4. Train the student-teachers to use drama to interrogate/question and seek clarity in the areas of 'discomfort' and 'confusion' to them (such as completely segregated social environments, bounded by caste, class, religions or gender, etc).
5. Train the students-teachers in choosing themes and stage them as skits plays/dramas/street plays, so that they can develop the ability to feel empathy for and relate with others.
6. Engage the student-teachers to nurture and build their sensitivities through drama, based on experience, emotions and interpretation.
7. Guide the student-teachers to identify and recognize local artists, drama experts in schools/ colleges and use them for transformational action.
8. Motivate the student-teachers to use drama as a '**critical pedagogy'** moving beyond the classroom and develop collective consciousness by involving the community to participate in educational and social change.
9. Guide the student-teachers to experience and stage different kinds of drama/skits/street plays /folk and contemporary traditions relating to day-to-day problems of people of different walks of life.
10. Invite local experts in music and explore the possibilities of teaching certain contents in school subjects through music.

Tasks and Assignments:

1. Write a detailed report on how you have used drama as a technique for teaching your school subject.
2. Write a comprehensive report on how you have used fine arts and music for teaching your school subject.

SEMESTER - IV