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

SEMESTER II

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 – II	6	20	120	3	30	70	100
II	Functional English	6	20	120	3	30	70	100
III	Core paper – III Analytical Geometry (3D) and Vector Calculus	6	20	120	3	30	70	100
III	Core Paper – IV Sequences and Series	6	20	120	3	30	70	100
III	Programming in C	6	20	120	2	25	50	75
IV	Childhood & Growing up Part - II	2	20	40	1(1/2)	15	35	50
IV	Understanding Disciplines and subjects	2	20	40	1(1/2)	15	35	50
IV	EPC 1 – Reading and Reflecting on texts	2	20	40	-	50	-	50
Total		**36**		**720**				**625**

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

(PHYSICS)

SEMESTER II

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-II	6	20	120	3	30	70	100
II	Functional English	6	20	120	3	30	70	100
III	Core Paper – II Thermal Physics and Statistical Methods	6	20	120	3	30	70	100
III	Extensible Learning Physics -II	3	20	60	2	25	50	75
III	Core Practical- I	3	20	60	3	40	60	100
III	Allied Mathematics - II	6	20	120	3	30	70	100
IV	Childhood & Growing up Part - II	2	20	40	1(1/2)	15	35	50
IV	Understanding Disciplines and subjects	2	20	40	1(1/2)	15	35	50
IV	EPC 1 – Reading and Reflecting on texts	2	20	40	-	50	-	50
Total		**36**		**720**				**725**

SEMESTER - II

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

(CHEMISTRY)

SEMESTER II

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-II	6	20	120	3	30	70	100
II	Functional English	6	20	120	3	30	70	100
III	Core paper II-Inorganic, Organic and Physical Chemistry –II	6	20	120	3	30	70	100
III	Chemistry for School Education paper-II	3	20	60	2	25	50	75
III	Core Practical-I Inorganic Qualitative Analysis	3	20	60	3	40	60	100
III	Allied Mathematics – II (or) Allied Zoology II	6 4	20 20	120 80	3 3	30 15	70 60	100 75
III	Allied Zoology Practical	2	20	40	3	20	30	50
IV	Childhood & Growing up Part - II	2	20	40	1(1/2)	15	35	50
IV	Understanding Disciplines and subjects	2	20	40	1(1/2)	15	35	50
IV	EPC 1 – Reading and Reflecting on texts	2	20	40	--	50	-	50
Total (Allied Maths) **Total (Allied Zoology)**		**36**		**720**				**725** **750**

SEMESTER - II

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

(BOTANY)

SEMESTER II

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 – II	6	20	120	3	30	70	100
II	Functional English	6	20	120	3	30	70	100
III	Core Paper - II Biodiversity- II- Pteridophytes, Gymnosperms And Paleobotany	6	20	120	3	30	70	100
III	Bio basics II- Botany	3	20	60	2	25	50	75
III	Core Practical - I	3	20	60	3	40	60	100
III	Allied Zoology	4	20	80	3	15	60	75
III	Allied Zoology Practicals	2	20	40	3	20	30	50
IV	Childhood & Growing up Part - II	2	20	40	1(1/2)	15	35	50
IV	Understanding Disciplines and subjects	2	20	40	1(1/2)	15	35	50
IV	EPC 1 – Reading and Reflecting on texts	2	20	40	-	50	-	50
Total		**36**		**720**				**750**

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

(ZOOLOGY)

SEMESTER II

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-II	6	20	120	3	30	70	100
II	Functional English	6	20	120	3	30	70	100
III	Core Paper – II Chordata	6	20	120	3	30	70	100
III	Basic Zoology -II	3	20	60	2	25	50	75
III	Core Practical- I	3	20	60	3	40	60	100
III	Allied Botany - II	4	20	80	3	15	60	75
III	Allied Botany Practical -I	2	20	40	3	20	30	50
IV	Childhood & Growing up Part - II	2	20	40	1(1/2)	15	35	50
IV	Understanding Disciplines and subjects	2	20	40	1(1/2)	15	35	50
IV	EPC 1 – Reading and Reflecting on texts	2	20	40	-	50	-	50
Total		**36**		**720**				**750**

SEMESTER - II

Gesneral Tamil – II

SUBJECT CODE:

காலம்: 120 மணிகள்

நோக்கம்

1. பக்தி இலக்கியங்களை அறிந்து கொள்ளல்,
2. சிற்றிலக்கியங்களின் பொருளை புரிந்துகொள்ளல் ,
3. இலக்கிய வரலாற்றில், சைவ, வைணவ, கிறிஸ்துவ, இஸ்லாமிய இலக்கியங்களின் வளர்ச்சியை அறிந்துகொள்ளல் ,
4. தமிழ் அறிவியல் கட்டுரைகளின் மூலம் சிந்தித்து எழுதும் திறன் வளர்த்தல் ,
5. பயன்பாட்டுத் தமிழின் மூலம் இலக்கணங்களை வாழ்வில் பயன்படுத்தல்.

அலகு– 1 செய்யுள் - பக்தி இலக்கியங்கள்

1. திருமூலர் - திருமந்திரம் 5 பாடல்கள் மட்டும்
2. தேவாரம் - திருஞானசம்பந்தர் பாடல்கள் (5 பாடல்கள்)
3. அப்பர் தேவராம் - மறுமாற்றத் திருத்தாண்டகம்
4. மாணிக்கவாசகர் - திருவாசகம் (முத்திக்கலம் புரைத்தல்)
5. ஆண்டாள் - திருப்பாவை (பத்துபாடல்கள்)
6. குலசேகர் ஆழ்வார் - பெருமாள் திருமொழி
7. எச்.ஏ. கிருஷ்ணபிள்ளை - இரட்சணிய யாத்திரிகம்
8. பட்டினத்தார் - தாய்மரித்த போது பாடியது
9. குணங்குடி மஸ்தான் சாகிபு–நந்தீஸ்வரக் கண்ணி

அலகு– 2 சிற்றிலக்கியங்கள்

10. முக்கூடற்பள்ளு – நாட்டுவளம் (மூத்தபள்ளி)
11. குற்றாலக் குறவஞ்சி - நாட்டுவளம், மலைவளம்-திரிகூடராசப்பக் கவிராயர்
12. மீனாட்சியம்மை பிள்ளைத்தமிழ் - குமரகுருபரர்
13. நந்திக் கலம்பகம் - கையறு நிலைப்பாடல்
14. தனிப்பாடல்கள் - காளமேகப் புலவர் & ஔவையார் பாடல்கள்
15. இராலிங்க அடிகளார் (வள்ளலார்) – திருவருட்பா ஆறாம் திருமுறை கோடையிலே இளப்பாறிக்.....(5 பாடல்கள்)

அலகு– 3 இலகிய வரலாறு – பக்தி இலக்கியங்கள், சைவம், வைணவம், கிறித்தவம், இஸ்லாம்.

சிற்றிலக்கியங்கள் - குறவஞ்சி, பள்ளு, பரணி, கலம்பகம், பிள்ளைத்தமிழ்

அலகு– 4 தமிழில் அறிவியல் கட்டுரைகள் (தொகுப்பு)

அலகு– 5 பயன்பாட்டுத் தமிழ்

1. ஆகர வரிசைப்படுத்துதல்
2. ஒருபொருள் குறித்த பல சொற்கள்
3. பல பொருள் குறித்த ஒரு சொல்
4. எழுத்துப் பிழை நீக்கி எழுதுதல்
5. ஒற்றுப் பிழை நீக்கி எழுதுதல்
6. தொடர் பிழை நீக்கம்
7. பிறமொழிச் சொற்களை நீக்கி எழுதுதல்

தேர்வுமுறை

முதல் பருவத் தேர்வு முறையைப் பின்பற்றுக

பார்வை நூல்கள்

1. ஜெகத்ரட்சகன்.எல்(1993), நாலாயிரத்திவ்ய பிரபந்தம், சென்னை: ஆழ்வார்கள் ஆய்வு மையம்.
2. திருஞான சம்பந்தர் மூர்த்தி நாயனார் (1955), தேவாரப் பதிகங்கள், தருமபுர ஆதினம் உரிமை பதிப்பு.
3. குணங்குடி மஸ்தான் சாகிபு , திருப்பாடற்றிரட்டு, சென்னை: வெளியீட்டாளர் இரத்தின நாயகர் அண்ட் சன்ஸ்.

SEMESTER - II

4. பட்டினத்தார்(1967), பட்டினத்துப் பிள்ளையார் திருப்பாடல்கள், திருநெல்வேலி: தென்னிந்திய சைவ பதிப்பகம்.
5. மு.அருணாசலம், (1975) தமிழ் இலக்கிய வரலாறு, சென்னை: தமிழியல் ஆய்வு மற்றும் வெளியீட்டு நிறுவனம்.

FUNCTIONAL ENGLISH
(Total: 120 Hrs)

SUBJECT CODE:

OBJECTIVES

- To provide practical, functional hands-on-learning experience to students in essential English grammar and usage.

UNIT-I WORD POWER

1. Synonyms
2. Antonyms
3. Prefixes and Suffixes

UNI- II KNOWLEDGE OF BASIC GRAMMAR

1. Articles
2. Preposition
3. Question Tag

UNIT-III KNOWLEDGE OF BASIC GRAMMAR

1. Voice
2. Infinitive gerund and participle

UNIT-IV APPLICATION OF ENGLISH GRAMMAR

1. Errors in the use of Articles
2. Errors in the use of Preposition
3. Errors in the use of Verbs

UNIT-V SENTENCE WRITING AND UNDERSTANDING

1. Sentence Pattern
2. Writing a Correct Sentence
3. Comprehension

REFERENCES

1. Luca Konig, (2016). *Correction of errors in written and spoken English*. UK: Oxford Press
2. Geoffrey Leech and Jain Suart, (2003). *Communicative grammar of English*. UK: Pearson Longman.
3. Agarwala N.K, (2014). *English grammar and composition*. New Delhi: Goyal Brothers Prakhasan.
4. Kokila S.Thangasamy, (2014). *Communicative English for college students*. Gandhigram (T.N): Arichum Blooms.

SEMESTER - II

MATHEMATICS

CORE PAPER – III
ANALYTICAL GEOMETRY (3D) AND VECTOR CALCULUS
(Total 120 Hrs)

SUBJECT CODE:

UNIT - I

The plane - Angle between two planes - length of perpendicular - Bisecting plane - Distance between two planes.

UNIT - II

The straight line - symmetric form - Image of a point - Image of a line about a plane - The plane and the straight line - Angle between a plane and straight line - Coplanar lines - Shortest distance between two lines.

UNIT - III

The sphere - Equation of the sphere - Length of the tangent plane - Section of a sphere - Intersection of two spheres - Equation of the tangent plane - Cone and cylinder.

UNIT -IV

Vector Differentiation - Gradient - Divergent - Curl - Properties and problems.

UNIT - V

Vector Integration - Line Integral - Surface Integral - Volume Integral - Green's theorem - Stoke's Theorem (Statements only) - Simple problems.

REFERENCES

1. Dr. S. Arumugam and Issac, (1996). *Analytical geometry of 3 dimensions and Vector Calculus*. New Gamma Publications.
2. Manickavasagam Pillai. T.K., and Narayanan (1998). *Analytical geometry of 3 dimensions* (Part II). S.V. Publications.

SEMESTER - II

CORE PAPER - IV

SEQUENCES AND SERIES

(Total 120 Hrs)

SUBJECT CODE:

UNIT - I

Sequences - Bounded, Convergent, divergent and Oscillating sequences - Algebra of limits - Behaviour of monotonic sequences.

UNIT - II

Cauchy's first limit theorem - Cauchy's second limit theorem - subsequences - Cauchy sequences - upper and lower limits of sequences.

UNIT - III

Infinite series - Tests of convergence of series of positive terms - Comparison test - Kummer's test - Root test, condensation test - Integral test - Convergence of geometric, harmonic, exponential, binomial and logarithmic series.

UNIT - IV

Alternating series - Absolute convergence - Tests of convergence of series of arbitrary terms - Rearrangement of series - Multiplication of series - power series.

UNIT - V

Fourier series - Trigonometric series - Even and odd functions - Half range Fourier series - extension to intervals of length 2π.

REFERENCES

1. Dr. S. Arumugam and Thanga Pandi Issac, (1997). *Sequences and series*. New Gamma Publishing House.

SEMESTER - II

PROGRAMMING IN C

(Total: 120 Hrs)

SUBJECT CODE:

UNIT - I

Identifiers, Key words, Variables - Operators and expressions - Data types.

UNIT - II

Input Output statements - Control statements - Looping statements.

UNIT - III

Arrays - Strings, function - Call by values, call by reference - string function.

Structures - User defined data types - Unions.

UNIT - IV

Introduction to pointers - Passing an address to a function, function returning pointers - Pointers and arrays - passing an array element to a function - array of pointers to string, limitation of array of pointers - Dynamic memory allocation.

UNIT - V

Introduction to files.

REFERENCE BOOKS

1. Les Han Cook, Morris Kringer, (1986). *The C primer*. McGraw Hill Book Co.
2. Kanetkar, Y., (2007). *Understanding C Pointers*. BPB Publications, New Delhi.
3. Gottfried. C, (1996). Programming Schaum outline series,
4. Balagurusamy. E, (1999). *Programming in C*. Tata Mc Graw Hill.

SEMESTER - II

PHYSICS

CORE PAPER-II
THERMAL PHYSICS AND STATISTICAL METHODS
SUBJECT CODE:

(Total:120 hrs)

UNIT-I: (24 hrs)
THERMOMETRY
Types of thermometers -Platinum resistance thermometer – Sebeck effect-Thermo electric thermometer-Helium vapour pressure thermometer-Callender & Griffith's bridge .
CALORIMETRY
Definitions-newtons law of cooling- Specific heat of capacity of gases- Dulong & Petit's law-Specific heat capacity of solids - Specific heat capacity of liquid-Callender and Barne's continious flow method- Specific heat of capacity of gases- C_p and C_v by Regnault's method.

UNIT-II: (24 hrs)
TRANSMISSION OF HEAT
Conduction – Co-efficient of the thermal conductivity – Cylindrical flow of heat – determination of thermal conductivity of rubber and bad conductor – Lee's disc method-Relation between thermal and electrical conductivities-Wiedmann franz law-– Applications of conduction of heat
Black body radiation– Stefan's law- Boltzmann law- Experimental Determination of Stefan's constant –Distribution of energy in the spectrum of black body-Wein's Law – Planck's theory of radiation-Pyrometry- solar constant-sources of solar energy-applications.

UNIT-III: (24 hrs)
KINETIC THEORY OF GASES
Postulates of kinetic theory of gases-degrees of freedom and Maxwells law of equipartion of energyMaxwell's law of distribution of molecular velocities – Experimental verification – equilibrium speed distribution of velocities. Mean free path – transport phenomena – diffusion – viscosity and thermal conduction of gases – Vander walls equation – relation between Vander Wall's constant and critical constants.
THERMODYNAMICS I
Zeroth law of thermodynamics- First law of thermodynamics – application of first law of thermodynamics-Isothermal process-Adiabatic process –Gas equation duringadiabaticprocessequations of the adiabatic curve- Reversible and Irreversible process– Second law of thermodynamics- Carnot's Theorem- Carnot's reversible engine-Rankine cycle-steam engine-Otto engine-diesel engine-working and efficiency.

THERMODYNAMICS II
First laten heat equation-second laten heat equation-Thermo dynamics scale of temperature-Entropy-Change of entropy-entropy diagramme-Third law of thermodynamics-Maxwells

thermodynamics relation's and applications-joule Kelvin effect- Claussius and Clapeyron equation.

UNIT-IV: (24 hrs)

LOW TEMPERATURE PHYSICS

Joule – Thomson effect –Kelvin effect- porous plug experiment-liquefaction of oxygen-liquefication of air-linde's process-liquefaction of helium – Kammerling – Onne's method – Helium I and II – Lambda point – production of low temperatures – adiabatic demagnetization – practical applications of low temperature – refrigerators and air-conditioning machines.

SUPERCONDUCTIVITY

Type I and II superconductors – Meissner effect – applications of superconductors – superconducting magnets- superconducting levitations.

UNIT-V: (24 hrs)

STATISTICAL METHODS

Phase Space – Micro and Macro canonical ensembles - different types of ensembles- degrees of freedom- statistical equilibrium - Definition - Probability theorem in Statistical thermodynamics.

Maxwell – Boltzmann law – distribution of velocity – Quantum Statistics — Fermi –Dirac Distribution Law – Bose–Einstein distribution law – comparison of three statistics-Applications of Bose Einstein and Fermi-Dirac gases as degenerate gases.

REFERENCES

1. 1. Mathur. D.S., (2002). *Heat and Thermodynamics*. S. Chand & Co.
2. Brij Lal and Subramaniam, S (2008). *Heat and Thermodynamics*. Chand & Co. 16th Edition.
3. Gupta and Kumar, (1996). *Elementary statistics*. Pragati Prakashan Meerut.
4. Rajam, J. B. and C. L. Arora, (1981).*Heat and Thermodynamics.* S. Chand & Co. New Delhi
5. Sathya Prakash and Agarwal, (2008). *Statistical Mechanics.* Kedarnath Ramnath publishers.
6. Halliday,D., Resnick and Walker, (2001). *Fundamentals of Physics.* 6th Edition. Wiley, NY.
7. Gupta, A.B. and Roy, H. (2002). *Thermal Physics*, Books and Allied (P) Ltd.
8. http://bookboon.com/en/physics-ebooks

EXTENSIBLE LEARNING PHYSICS –II

SUBJECT CODE:

(Total: 60 hrs)

UNIT -I (12 hrs)

SOUND

Production of sound – vibrating bodies – musical instruments – sound produced by humans – larynx – vocal cords – propagation of sound in air and vacuum - hearing of sounds – mechanism of human ear –audible and inaudible sounds – difference between noise and music – limitations – loudness.

Activities And Demonstrations

Demonstration of propagation of sounds through solid , liquid and vacuum – toy telephone – Measurement of sound from various devices – preparation chart on loudness of sound from various sources.

UNIT-II (12 hrs)

PRESSURE

Definition-pressure exerted by liquids-pressure exerted by gases -Traditional unit of pressure-SI unit of pressure-Manometric units-imperial and customary units-non-SI metric units-atmospheric pressure-Hydrostatic pressure-torr-Manometre –barometre-blood pressure.

Activities And Demonstrations

Demonstration of distribution of pressure at pointed edge and flat surface-examples-relation between pressure and length of the water column in a pipe-Pressure of atmosphere and your head-Techniques for measuring blood pressure.

UNIT-III (12 hrs)

HEAT AND TEMPERATURE MEASUREMENTS

Definitions-temperature-Temperature measurements-various unit of temperature-Thermometer-Clinical thermometer-Laboratory thermometer-conversion of temperature from Fahrenheit to centigrade and Kelvin scale.

Activity and Demonstration

Explanation on methods of reading a clinical thermometer- limitations - temperature of human body- verification of body temperature with different people - normal temperature that of animals-features and handling methods of laboratory thermometer.

UNIT-IV (12 hrs)

TRANSPORTATION OH HEAT

Conduction-Convection and radiation -Explanation of flow of heat-insulators-experiment to describe conduction and convection-Transfer of heat by convection in air-heating property of black and white paper-natural fossils and fuels.

Activity and Demonstration:

Demonstrating of conduction of heat in metals - demonstration of convection in air -sea breeze and land breeze.

SEMESTER - II

UNIT-V (12 hrs)

ENVIRORMENTAL PHYSICS

Solar energy-wind energy – tidal energy-green house effect-green house gases - ozone hole-terrestial radiation-physics of cloud formation-sources of noise pollution-sources of radioactive pollution.

Activities and demonstration

Problem of radioactive waste disposal-noise pollution effect on general health-demonstartion of disposal of urban waste and industrial waste.

REFERENCES

1. CRC Handbook of Physics & Chemistry, (1999),NY,CRS Press,.
2. D.Halliday, R.Resnick and J.Walker,(2001).Fundamentals of Physics, NY ,Wiley,
3. D.Halliday, R.Resnick and K.S.Krane,(1994).Physics, Vols I, II &III Extended,
4. Dr.J.P.Sharma.(2009),Comprehensive Environmental studies, New Delhi, Laxmi publications
5. NCERT (NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING) Text Books for standard VI,VII,VIII,New Delhi.
   NY ,Wiley
6. R P. Feynman, R B Leighton and M Sands,(1998),The Feynman Lectures on Physics, VoIs. I, II, and III, New Delhi,.Narosa,
7. Tamil Nadu Text Books for CBSE VI,VII, VIII.
8. Tamil Nadu Text Books for standard VI,VII, VIII.
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 - I

SUBJECT CODE:

(Total : 60 hrs)

(Any 12 Experiments)

1. Measurements of length (or diameter) using Vernier calipers, Screw gauge and Travelling microscope.
2. Youngs modulus – non uniform bending – pin and microscope.
3. Youngs modulus – non uniform bending – optic lever method
4. Young's modulus cantilever depression – scale and telescope method.
5. Rigidity modulus – torsional pendulum .
6. Rigidity modulus–static torsion– scale and telescope method.
7. Surface tension and interfacial surface tension – drop weight method.
8. Coefficient of viscosity of liquid – graduated burette – Radius of cappellet method.
9. Comparison of viscosities – (h1/h2)..
10. Compound Pendulum – Determination of 'g'and 'k'
11. Thermal conductivity of a bad conductor – Lee's disc method.
12. Specific heat of liquid – Newtons law of cooling.
13. Sonometer – frequency of tuning fork.
14. Melde's string frequency of vibrator
15. Viscosity by capillary flow method
16. Sonometre frequency of AC
17. Joules calorimeter –determination of specific heat capacity of liquid
18. Spectrometer –refractive index of prism – μ of a liquid.
19. Determine the frequency of a given tuning fork – Sonometer

REFERENCES

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

ALLIED MATHEMATICS –II

SUBJECT CODE:

(Total :120 Hrs)

UNIT-I

INTEGRATION: Reduction formula

FOURIER SERIES: Fourier series – Even and odd functions – Half range Fourier series – Development in Cosine series – Development in sine series.

UNIT-II

ORDINARY DIFFERENTIAL EQUATIONS : Variable separable – Homogeneous equations – Non- Homogeneous equations – Linear equations – Bernoulli's equations – First order higher degree equations.

UNIT-III

PARTIAL DIFFERENTIAL EQUATIONS : Derivation of Partial differential equations - Eliminations of arbitrary constants / functions – Different integrals of partial differential equations – Four standard types of first order equations – Lagrange's equations.

UNIT-IV

LAPLACE TRANSFORMS : Definition – Laplace transforms of standard functions – Inverse Laplace Transforms – Applications to solve ordinary differential equations.

UNIT-V

VECTOR ANALYSIS : Vector differentiation – Gradient of a scalar point function – Divergence and Curl – Formula connecting Divergence and Curl – Vector integration – Line integral – Volume integral – Surface integral – Statement of Stoke's and Gauss theorem – Simple applications. (Chapter 8 : Sections : 1.11, 1.12, 1.17 to 1.20, 2, 4, 5, 6, 9)

REFERENCES

1. S. Narayanan, R. Hanumantha Rao, Manickavachagam Pillai and P. Kandaswamy (2007). *Ancillary Mathematics (Volume II).* S. Viswanathan Printers & Publishers Pvt Ltd.

2. .K. Manickavachagam Pillay and S. Narayanan, (2007). *Calculus (Vol. III)* Viswanathan Printers & Publishers Pvt Ltd.

CHEMISTRY

CORE PAPER- II
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY – II

SUBJECT CODE:

(Total: 120Hours)

UNIT-I

Chemical bonding- Valence Bond theory-formation of H_2 molecule- concept of resonance-resonance energy- resonance structures of CO_3^{2-} ion, O_3 and CO molecules. Molecular Orbital theory (MOT)-bonding and antibonding molecular orbitals. M.O. diagram and bond order calculations for H_2, He_2, N_2 and O_2. Valence Shell Electron Pair Repulsion (VSEPR) theory-geometry of BeF_2, BF_3, CH_4, NH_3, H_2O and PCl_5 only.Hydrogen bonding-intermolecular, intramolecular-consequences.

(**24Hours)**

UNIT-II

General methods of preparation of alkynes, properties of alkynes-acidity of alkynes, hydration, hydroboration, oxidation with $KMnO_4$,ozonolysis and polymerization.Alkadienes-preparation-stability of conjugated dienes-1,2 and 1,4 addition. Diels- Alder reaction.

Alkyl halides-preparation by direct halogenations of alkenes, hydrohalogenation of alkenes and alkynes.Aliphatic nucleophilic substitution-S_N1 and S_N2 mechanisms.Grignard reagent preparation.Synthesis of alcohols, ketones, carboxylic acids and ethers from Grignard reagents. (**24Hours)**

UNIT-III

Cycloalkanes-synthesis by internal Wurtz reaction and Dieckmann reaction-ring opening reaction of cyclopropane and cyclobutane.Baeyer's strain theory, Sache-Mohr theory.Aromaticity - Huckle's rule and its applications to benzene, naphthalene, pyridine, pyrrole, cyclopropenylcation and cyclopentadienyl anion. Aromatic hydrocarbons - mechanism of aromatic electrophilic substitution reactions- nitration, sulphonation, Friedel-Crafts alkylation and acylation of benzene.

(**24Hours)**

UNIT-IV

Gaseous state-postulates of kinetic theory of gases-derivation of kinetic gas equation-derivation of Boyle's law, Charles' law, Avogadro's law, ideal gas equation, Graham's law of diffusion and Dalton's law of partial pressures from kinetic gas equation. Maxwell's distribution of molecular velocities (derivation not necessary).Root mean square velocity, average velocity and most probable velocity (derivation of equations not necessary). Collision diameter, collision frequency and mean free path (definition only).

(**24Hours)**

UNIT-V

Colloids-classification, preparation and purification of colloids.Properties of colloids-optical, kinetic and electrical properties.Origin of charge of colloidal particles.Emulsions and gels-elementary treatment only.

Solid state-crystalline and amorphous solids-difference between them. Crystal systems-definitions of space lattice, Unit cell, Bravais lattice. Weiss and Miller indices.

(**24Hours)**

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 Inorganic Chemistry, Delhi, Milestone publishers & distributors.
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4. http://www.askiitians.com/iit-jee-chemical-bonding/
5. https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/chapt5.htm
6. https://www.studyadda.com/notes/neet/chemistry/states-of-matter/kinetic-theory-of-gases/9024.

CHEMISTRY FOR SCHOOL EDUCATION - PAPER – II

SUBJECT CODE:

(Total: 60Hours)

UNIT-I WIND

Wind – definition – demonstration experiments showing (i) the pressure exerted by air (ii) the increased wind speed accompanied reduced air pressure (iii) the movement of air form higher pressure to lower pressure (iv) warm air lighter than cold air.

(12Hours)

UNIT-II SOIL

Soil – definition – Profile – types of soil – properties of soil – soil moisture – soil erosion.Determination of soil percolation rate.Determination of percentage of water absorbed by soil.

(12Hours)

UNIT-III MICROORGANISMS

Microorganisms – definition – application of microorganisms – domestic use – commercial use – medicinal use environmental cleaning – fertility improvement of soil.Food preservation – chemical method.Nitrogen fixation – nitrogen cycle.

(12Hours)

UNIT-IV METALS AND NON-METALS

Metals and non-metals - Physical and chemical properties and uses. Demonstration experiments on (i) conducting materials (ii) chemical properties of metals and displacement reactions. **(12Hours)**

UNIT-V FUELS

Fuels – definition – fuel efficiency.Coal – coke – petroleum refining – natural gas. Combustion – types of combustion – ignition temperature – inflammable substances. Global warming – acid rain.Demonstration experiments showing (i) air essential for burning (ii) heating water in a paper cup.

(12Hours)

REFERENCES

1. 6^{th}, 7^{th} and 8^{th} Standard science books, New Delhi, NCERT (National Council of Educational Research and Training).
2. http://ncert.nic.in/textbook/textbook.htm?kech1=0-7
3. http://chemistrynoteslecture.com/Unitshtml
4. https://byjus.com/ncert-solutions-class-8-science/chapter-18-pollution-air-water/

CORE PRACTICAL-I

SUBJECT CODE:

(Total: 60 Hrs)

A. INORGANIC QUALITATIVE ANALYSIS

Semi micro method of analysis of a mixture containing two cations and two anions of which one may be an interfering acid radical requiring elimination during the analysis of basic radical.

1. Basic radicals: - Lead, copper, zinc, bismuth, cadmium, tin, iron, aluminium, manganese, magnesium, cobalt, nickel, calcium, barium, strontium, ammonium

2. Acidic radicals: - Sulphate, carbonate, nitrate, chloride, bromide, iodide, oxalate, arsenite, arsenate, phosphate, borate and chromate

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

ALLIED MATHEMATICS –II

SUBJECT CODE:

(Total :120 Hrs)

UNIT-I

INTEGRATION: Reduction formula

FOURIER SERIES: Fourier series – Even and odd functions – Half range Fourier series – Development in Cosine series – Development in sine series.

UNIT-II

ORDINARY DIFFERENTIAL EQUATIONS : Variable separable – Homogeneous equations – Non- Homogeneous equations – Linear equations – Bernoulli's equations – First order higher degree equations.

UNIT-III

PARTIAL DIFFERENTIAL EQUATIONS : Derivation of Partial differential equations - Eliminations of arbitrary constants / functions – Different integrals of partial differential equations – Four standard types of first order equations – Lagrange's equations.

UNIT-IV

LAPLACE TRANSFORMS : Definition – Laplace transforms of standard functions – Inverse Laplace Transforms – Applications to solve ordinary differential equations.

UNIT-V

VECTOR ANALYSIS : Vector differentiation – Gradient of a scalar point function – Divergence and Curl – Formula connecting Divergence and Curl – Vector integration – Line integral – Volume integral – Surface integral – Statement of Stoke's and Gauss theorem – Simple applications. (Chapter 8 : Sections : 1.11, 1.12, 1.17 to 1.20, 2, 4, 5, 6, 9)

REFERENCES

1. Narayanan, S., HanumanthaRao, ManickavachagamPillai and Kandasamy.,P, (2007). *Ancillary Mathematics* (Volume II), S. Viswanathan Printers & Publishers Pvt. Ltd.,

2. Manickavachagam Pillay, T.K. and Narayanan, S. (2007). *Calculus* (Vol. III), S. Viswanathan Printers & Publishers Pvt Ltd.

ALLIED ZOOLOGY – II
(FOR BOTANY & CHEMISTRY MAJOR STUDENTS)
SUBJECT CODE:

(Total: 80hrs)

UNIT-I
Chordata – Classification and characteristics, Prochordates - Type study : Amphioxus

UNIT-II
Shark (Morphology and anatomy – except skeletal and muscular system)

UNIT-III
Frog (Morphology and anatomy – except skeletal and muscular system)
Calotes (Morphology and anatomy – except skeletal and muscular system)

UNIT-IV
Pigeon (Morphology and anatomy – except skeletal and muscular system)

UNIT-V
Rabbit (Morphology and anatomy – except skeletal and muscular system)

REFERENCES

1. EkambaranathaAyyar, M and Ananthakrishnan, T.N. (1993).*Outlines of Zoology.Vol.I and II*, Madras :Viswanathan and Co..
2. Linville & Kelly (1993). *Textbook of General Zoology*. NewDelhi: Discovery publishing House.
3. Dhami,P,S&Dhami,J,K. *Invertebrate Zoology*. New Delhi: S. Chand and Co.
4. Jordan, E.K. and P.S. Verma. (1993). *Chordate Zoology.*(12^{th} ed.).New Delhi:S. Chand & Co. Ltd.,
5. Trilok Chandra Majupuria. (1962). *A textbook of Invertebrate Zoology*. Jullundur City: S.Nagin

ALLIED ZOOLOGY PRACTICAL
(FOR BOTANY & CHEMISTRY MAJOR STUDENTS)

SUBJECT CODE:

(Total: 40 Hrs)

I-DISSECTION

Cockroach: Digestive and Nervous system
Prawn : Nervous system

II-MOUNTING

Mouth parts of cockroach, mosquito, house fly, prawn appendages ,placoid scales

III-SPOTTERS

Entamoeba, Plasmodium, Paramoecium, Paramoecium-Conjugation, Sycon, Obeliageniculata,

(colony& medusa) , Fasciola hepatica (Entire & Transverse section), Taeniasolium (Entire & Transverse section), Leech (Entire & Transverse section), Earth worm , Prawn, Pila , Fresh

water mussel, star fish , Amphioxus, Shark, Frog , Pigeon and Rat.

IV-RECORD

REFERENCES

1. EkambaranathaAyyar, M and Ananthakrishnan, T.N. 1993, Outlines of Zoology, Vol.I and II, Viswanathan and Co. Madras.
2. Jordan, E.K. and P.S. Verma, 1993. Chordate Zoology, 12th edition, S. Chand & Co. Ltd., Ram Nagar, New Delhi

BOTANY

CORE PAPER: II
BIODIVERSITY II- PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY
SUBJECT CODE:

(Total: 120 hrs)

PTERIDOPHYTES

UNIT-I

General Characters and Classification based on Reimer (1954); Structure and reproduction of the following: Psiloptopsida – Psilotum; Lycopsida – Selaginella

UNIT-II

Structure and reproduction of the following: Sphenosida – Equisetum; Pteropsida – Adiantum.

GYMNOSPERMS

UNIT-III

Gymnosperms: General Characters and Classification (Chamberlain ,1935). Structure and reproduction of the following: Cycadales – Cycas,

UNIT-IV

Structure and reproduction of the following Coniferales - Pinus.

PALEOBOTANY

UNIT-V

Study of fossils and fossilization. Kinds of fossils-compression,casts,molds,petrification, impressions and coal balls. Dating of fossils-Radio carbon dating Geological time scale.Type study-Lepidodendron, Calamites and Williamsonia.

REFERENCES

1. Vashista, P.C, (1967), *Botany for Degree Students Vol. IV*, S.Chand& Co. New Delhi.
2. Vashista, P.C, (1976), *Botany for Degree Students Vol. V (Gymnosperms)*S.Chand& Co. New Delhi.
3. Sukla& Mishra, S.P, (1982), *Essentials of Palaeobotany,*Vikas Publishing House.
4. Smith, G.M, (1955),*Cryptogamic Botany Vol. I & II,* McGraw Hill Company.
5. Chamberlain, C.A, (1986), *Gymnosperms – Structure and Evolution,* CBS Publishers & Distributors
6. Sporne, K.R, (1976), *Morphology of Pteridophytes*B.I.Publishers
7. Sporne, K.R, (1976), *Morphology of Gymnosperms,*B.I.Publishers.
8. Arnold, C.A, (1947), *An introduction to Palaeobotany,* McGraw Hill Publisher.
9. www.biology discussion. Com
10. www.biologywise.com
11. http://phycolab.yolasite.com/students.php

SEMESTER - II

BIO BASICS- II - BOTANY

SUBJECT CODE:

(Total:60 Hrs)

MORPHOLOGY

ROOT- types of root system- Trap root Fibrous root and adventitious root
Modifications of Root for support, storage and respiration

STEM-Types of shoot system- Modification of the shoot system for Food storage- zupport- Protection- vegetative propagation- assimilation of food.

LEAF-Venation- types of venation
Phyllotaxy- types of phyllotaxy
Modification of Leaf

INFLORESCENCE-Racemose,Cymose,Mixed and special types

FLOWER-Description of floral parts-Structure of Calyx -Structure and types of Corolla- Aestivation

Androecieum structure and types; Gynoceium – structure and types -Placentation types.

REFERENCES

1. NarayanaSwamy, R.V, Rao K.N, (2009),*Outlines of Botany*,V.Subramanian Pvt. Limited, Chennai.
2. Pandey, B.P, (2011). *Botany for Degree students*, S.Chand&Co.Ltd., New Delhi .
3. Pandey, B.P, (2010,)*Modern Practical Botany vol I, II, III*, S.Chand& Company Ltd. New Delhi.

CORE PRACTICAL I

(Total: 60 Hrs)

Subject Code:

PRACTICALS

BIODIVERSITY- I: ALGAE, FUNGI, LICHENS AND BRYOPHYTES

1. Micro preparation ofthe types prescribed in the syllabus.
2. Identifying the micro slides relevant to the syllabus.
3. Identifying types of algae mixtures.

PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY

1. Making suitable micro preparations of the types prescribed in Pteridophytes and Gymnosperms.
2. Observing and identifying the fossil slides included in the syllabus.

REFERENCES

1. Arnold, C.A, (1947), *An introduction to Palaeobotany,* McGraw Hill Publisher.
2. Chamberlain, C.A, (1986), *Gymnosperms – Structure and Evolution,* CBS Publishers & Distributors
3. Chopra G.L., (1990) *A Text book of Fungi*, S.Nagin& Co. Meerut, India
4. Dube, H., 1978, A textbook of Fungi, Bacteria and Virus. Vikas Publishers.
5. Pandey, B.P, (1997) College Botany Vol. I Fungi & Pathology.
6. Pandey, B.P,(2000) *Text Book of Botany Algae,*S.Chand& Company, New Delhi.
7. PremPuri,(1981), *Bryophytes –Morphology, growth and differentiation* – Atma Ram & Sons, Delhi.
8. Sharma, O.P,(1992), *Text Book of Algae*, Tata McGraw Hill Publication Company Ltd., New Delhi
9. Smith, G.M, (1955),*Cryptogamic Botany Vol. I & II,* McGraw Hill Company.
10. Sporne, K.R, (1976), *Morphology of Gymnosperms,*B.I.Publishers.
11. Sukla& Mishra, S.P, (1982), *Essentials of Palaeobotany,*Vikas Publishing House.
12. Vashista Sinha, B.R, Singh, V.P, (2002), *Botany for Degree students- Algae* 9th revised edition, S.Chand& Company Ltd., New Delhi.
13. Vashista, P.C, (1967), *Botany for Degree Students Vol. IV*, S.Chand& Co. New Delhi.

14. Vashista, P.C, (1976), *Botany for Degree Students Vol. V (Gymnosperms)*S.Chand& Co. New Delhi.
15. Vashista B.R ,(1982), *Botany for Degree Students – Fungi*-S.Chand& Co New Delhi.
16. http://phycolab.yolasite.com/students.php
17. http://phycolab.yolasite.com/students.php
18. www.biology discussion. Com
19. www.biology discussion. Com
20. www.biologywise.com

ALLIED ZOOLOGY
(FOR BOTANY & CHEMISTRY MAJOR STUDENTS)

SUBJECT CODE:

(Total: 80hrs)

UNIT-I

Chordata – Classification and characteristics, Prochordates - Type study : Amphioxus

UNIT-II

Shark (Morphology and anatomy – except skeletal and muscular system)

UNIT-III

Frog (Morphology and anatomy – except skeletal and muscular system)

Calotes (Morphology and anatomy – except skeletal and muscular system)

UNIT-IV

Pigeon (Morphology and anatomy – except skeletal and muscular system)

UNIT-V

Rabbit (Morphology and anatomy – except skeletal and muscular system)

REFERENCES

1. Ekambaranatha Ayyar, M and Ananthakrishnan, T.N. 1993, Outlines of Zoology, Vol.I and II, Madras. Viswanathan and Co.
2. Ayyar, E.K. and T.N. Ananthakrishnan, 1992. Manual of Zoology Vol. 1 (Invertebrate), Parts I & II. Madras. S. Viswanathan (Printers and Publishers) Pvt Ltd.,
3. Jordan, E.K. and P.S. Verma, 1993. Invertebrate Zoology, 12th Edition, New Delhi, S. Chand & Co Ltd
4. Kotpal, R.L., 1988 – 1992. (All Series) Protozoa, Porifera, Coelentereta, Annelida, Arthropoda, Mollusca, Echinodermata, Meerut , Rastogi Publications.
5. Jordan, E.K. and P.S. Verma, 1993. Chordate Zoology, 12th edition, New Delhi.,S. Chand & Co. Ltd.,
6. Jordan, E.K. and P.S. Verma, 1995. Chordate Zoology and Elements of Animal Physiology, 10th edition, New Delhi. S. Chand & Co Ltd.
7. Nigam, H.C., 1983. Zoology of Chordates, Jalandhar , Vishal Publications.
8. http://onesourcebook.com/download/biology-of-invertebrates.pdf
9. http://www.ebooksdownloads.xyz/search/an-introduction-to-the-invertebrates
10. https://thebookee.net/in/invertebrate-zoology-p-s-verma-and-jordan-free-pdf-books-download.
11. http://www.e-bookdownload.net/search/anatomy-of-the-chordates-fourth-edition
12. https://www.kopykitab.com/Chordate-Zoology-by-E-L-Jordan-And-Dr-P-S-Verma
13. http://bestlibrary.co/download/chordate-zoology.pdf

SEMESTER - II

ALLIED ZOOLOGY PRACTICALS
(FOR BOTANY & CHEMISTRY MAJOR STUDENTS)

SUBJECT CODE:

(Total: 40 Hrs)

I. DISSECTION

Cockroach: Digestive and Nervous system
Prawn : Nervous system

II. MOUNTING

Mouth parts of cockroach, mosquito, house fly, prawn appendages ,placoid scales

III. SPOTTERS

Entamoeba, Plasmodium, Paramoecium, Paramoecium-Conjugation, Sycon, Obeliageniculata, (colony& medusa) , Fasciola hepatica (Entire & Transverse section), Taeniasolium (Entire & Transverse section), Leech (Entire & Transverse section), Earth worm , Prawn, Pila , Fresh water mussel, star fish , Amphioxus, Shark, Frog , Pigeon and Rat.

IV. Record

REFERENCES

1. EkambaranathaAyyar, M and Ananthakrishnan, T.N. 1993, Outlines of Zoology, Vol.I and II, Viswanathan and Co. Madras.
2. Jordan, E.K. and P.S. Verma, 1993. Chordate Zoology, 12th edition, S. Chand & Co. Ltd., Ram Nagar, New Delhi

ZOOLOGY

CORE PAPER II
CHORDATA

SUBJECT CODE:

(Total: 120 hrs)

UNIT- I (24 hrs)

General characterisitics of chordates ; Cephalochordata, Hemichordata , Urochordata , Agnatha – General characters , cyclostomata – General characters - Type study -petromyzon .

UNIT-II (24 hrs)

Pisces- General characters and classification – Type study –Shark ; accessory respiratory organs , lung fishes ; parental care and migration in fishes.

Amphibians - General characters and classification – Type study – Frog , parental care in amphibians

UNIT-III (24 hrs)

Reptiles - General characters and classification – Type study –Calotes ; poisonous and non-poisonous snakes , poison apparatus ; chelonia , sphenodon and crocodilian

UNIT-IV (24 hrs)

Aves - General characters and classification – Type study – Pigeon ; flightless birds ; flight adaptations ; migration in birds

Mammals - General characters and classification – Type study –Rabbit ; egg laying mammals; marsupials , placental mammals; dentition and adaptive radiation in mammals.

UNIT-V (24 hrs)

Comparative study of integument , heart , brain in mammals.

REFERENCES

1. Hickman, C.P. Jr., F.M. Hickman and L.S. Roberts, 1984. Integrated Principles of Zoology, 7th Edition, St. Louis ,times Merror/Mosby College Publication..
2. Newman, H.H., 1981. The Phylum Chordata, Agra , Satish Book Enterprise.
3. Parker and Haswell, 1964. Text Book of Zoology, Vol II (Chordata), New Delhi , A.Z.T, B.S. Publishers and Distributors
4. Waterman, Allyn J. et al., 1971. Chordate Structure and Function, New York,
5. Mac Millan & Co.
6. Ayyar, E.K. and T.N. Ananthakrishnan, 1992. Manual of Zoology Vol. II (Chordata), Madras S. Viswanathan (Printers and Publishers) Pvt Ltd.
7. Jordan, E.K. and P.S. Verma, 1995. Chordate Zoology and Elements of Animal Physiology, 10th edition, New Delhi. S. Chand & Co Ltd.
8. Nigam, H.C., 1983. Zoology of Chordates, Jalandhar , Vishal Publications.
9. http://www.e-bookdownload.net/search/anatomy-of-the-chordates-fourth-edition
10. https://www.kopykitab.com/Chordate-Zoology-by-E-L-Jordan-And-Dr-P-S-Verma
11. http://bestlibrary.co/download/chordate-zoology.pdf

SEMESTER - II

BASIC ZOOLOGY II

SUBJECT CODE:

(Total: 60 hrs)

UNIT-I (12 hrs)

Diversity in living organisms – cellular grade of organization

Cell - fundamental unit - Structure of cell ; Types of human cells : nerve, flame , gland cell, egg , RBC, muscle, epithelial cell

UNIT-II (12 hrs)

Cell organelles – Endoplasmic reticulum , ribosomes , Golgi apparatus , lysosome, mitochondria, centriole, nucleus

UNIT-III (12 hrs)

Tissue and organ grade of organization:

Tissues : epithelial , vascular, connective , nerve , muscular tissues

Organs : eye , kidney

Cellular respiration : aerobic , anaerobic ; metabolism : anabolism , catabolism

Activities : Use of a microscope, preparation of a slide & observation of cheek cells, permanent slides showing different cells, tissues, blood smear; observation of diverse types of cells from animals (some permanent slides).

UNIT-IV (12 hrs)

Design of body

Body contour – fish – swimming ; bird , flight adaptations in birds ; horse - running adaptations

UNIT-V (12 hrs)

Body movements - In man - Bones , muscles , cartilage , joints and types of joints ; skeleton – axial and appendicular ; model of skeleton, X-rays of arms or legs, chest, hips, jaws, vertebral column in animals - Fish, earthworm, snail cockroach, snake and birds.

Activities : To study X-rays of human , to find out the direction in which joints bend, feel the ribs, backbone etc. Observation/ discussion on movement and skeletal system in other animals.

REFERENCES

1. B.S. Beckett , 1986 Biology– A modern introduction .– New York , Oxford University Press
2. Robert Wallace , 1992 ,Biology Science of Life , New York, Sanders and Ferl- Harper Collins College Publishers.
3. John Sears and Sue Taylor , 1994 Life & Living — London, Hodder & Stoughton .
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5. Lewis , Gaffin, Hoefnagles , Parker , 2002, Life 4th edn, New York , McGraw

SEMESTER - II

Hill .
6. Saundra Alters , 2000 , Biology: understanding life 3rd edn , , UK , Jones & Barthlett Publishers.
7. TamilNadu Text book : for standards VI,VII,VIII ,2017 Chennai, Tamil Nadu text books and educational service corporation.
8. P.S.Verma & V.K. Agarwal 2016, Science for ninth class Part 3 Biology , New Delhi S.Chand & Co Ltd
9. N.Arumugam , 1999 , Cell biology, Ahmedabad, Saras publications
10. Modern Zoology - Ramesh Gupta , Meerut ,G.R. Bathla Publications Pvt. Ltd.
11. T.S.Ranganathan 2000 , Human anatomy ,New Delhi S.Chand & Co. , Ltd.
12. TamilNadu Text book : for standards VI,VII,VIII , 2017 Chennai, Tamil Nadu text books and educational service corporation
13. https://en.wikibooks.org/wiki/General_Biology/Classification_of_Living_Things/Classification_and_Domains_of_Life
14. https://books.google.co.in/books/about/Classification_of_Living_Organisms.
15. http: www.en. Wikipedia.org/wiki/microorganism
16. https://www.curwensville.org/cms/lib2/PA01000485/Centricity/Domain/111/cell Organization.pdf
17. http://longfiles.com/vnomi0qlout2/Cellular_Respiration_(Biology_Collection).pdf.html

https://www.exploringnature.org/graphics/teaching_aids/Tissue_identification.pdf

CORE PRACTICAL I

SUBJECT CODE:

(Total 60 Hrs)

INVERTEBRATA & CHORDATA

I. DISSECTION

Cockroach: Digestive system, Nervous system, Reproductive system,
Prawn : Digestive system, Nervous system
Fish : Digestive system

II. MOUNTING

Mouth parts: Cockroach, House fly, Mosquito
Prawn appendages: Cephalic, Thoracic, Abdominal
Fish : scales

III. SPOTTERS

Classify giving reasons:

Paramoecium	Sycon sponge	Aurelia Calotes	Rabbit
Liver fluke	Ascaris	Nereis Naja Naja	
Prawn	Fresh water mussel	Star fish Columba	

Draw labeled sketches:

T.S. of Taenia solium	Physalia	Paramecium	T.S. of liver fluke
Obelia medusa	Ephyra larva	Redia larva	
Cercaria larva	Mysis larva	Alima larva	

Biological significance:

Paramecium – Conjugation	Velella	Heteronereis	Amphioxus
Trochophore larva	Chaetopterus	Peripatus	Balanoglossus
Limulus	Chiton	Entamoeba	Hippocampus
Plasmodium	Obelia colony	Liver fluke – miracidium	
Taenia – Mature proglottid	Ascaris	Millipede	Ichthyophis
Centipede	Sepia	Octopus	Rhacophorus
Sea cucumber	Sea urchin	Leech	Chameleon
Nauplius larva	Zoea larva	Sacculina on crab	
Sea anemone on Hermit crab			

Relate structure and function:

Sponge – Spicules	Sponge – Gemmule	Taenia – Scolex
Nereis – Parapodium	Prawn – Petasma	Honey bee – Sting apparatus
Scorpion – Book lung	Starfish – Pedicellariae	Starfish - Tube foot
Draco / wing	Pigeon – synsacrum /keel	

Medical Importance
Parasitic protozoans, Parasitic helminthes.
Economic Importance
Sponges , corals, shells, prawns

IV. RECORD

V. FIELD VISIT TO MUSEUM - REPORT

REFERENCES

1. Hickman, C.P. Jr., F.M. Hickman and L.S. Roberts, 1984. Integrated Principles of Zoology, 7th Edition, times Merror/Mosby College Publication. St. Louis. 1065 pp.
2. Newman, H.H., 1981. The Phylum Chordata, Satish Book Enterprise, Agra – 282 003, 477 pp.
3. Parker and Haswell, 1964. Text Book of Zoology, Vol II (Chordata), A.Z.T, B.S. Publishers and Distributors, New Delhi – 110 051, 952 pp.
4. Waterman, Allyn J. et al., 1971. Chordate Structure and Function, Mac Millan & Co., New York, 587 pp.
5. Ayyar, E.K. and T.N. Ananthakrishnan, 1992. Manual of Zoology Vol. II (Chordata), S. Viswanathan (Printers and Publishers) Pt Ltd., Madras, 891P.
6. Jordan, E.K. and P.S. Verma, 1995. Chordate Zoology and Elements of Animal Physiology, 10th edition, S. Chand & Co Ltd., Ram Nagar, New Delhi, 1151 pp.
7. Nigam, H.C., 1983. Zoology of Chordates, Vishal Publications, Jalandhar – 144 008, 942.

ALLIED BOTANY II

SUBJECT CODE:

(Total: 80 Hrs)

MORPHOLOGY

UNIT-I

Root-Types and Modification; Stem-Aerial Modifications;Leaf-Phyllotaxy,simple and compound leaves and modifications;Inflorescence-Racemose,Cymose,Mixed and special types

UNIT-II

Flower-Description of floral parts; Fruits-Simple-berry,drupe,pepo,hesperidium, legume,loculicidalcapsule,achene.aggregate of berries,Multiple-sorosis.Seed-dispersal

ANGIOSPERM TAXONOMY

UNIT-III

General outline of Bentham and Hooker's system of classification study of the range of characters and plants of economic importance in the following families: Brassicaceae ,Cucurbitaceae, Asteraceae, Solanaceae, Euphorbiaceae,Liliaceae.

ANATOMY AND EMBRYOLOGY

UNIT-IV

Simple and compound tissues. Primary structure of dicot stem,root and leaf.Structure of mature anther. Structure of mature ovule- its types. Structure of pollengrain. Development of male gametophyte and female gametophyte, Fertilization

PLANT PHYSIOLOGY

UNIT-V

Transpiration, Respiration-Glycolysis,Kreb'scycle,Electron Transport System. Photosynthesis-Light and Dark reaction (Calvincycle).Nitrogen metabolism-Biological nitrogen fixation, non-biological nitrogen fixation

REFERENCES

1. NarayanaSwamy, R.V, Rao K.N, (2009), *Outlines of Botany* ,V. Subramanian Pvt. Limited, Chennai.
2. Pandey, B.P, (2011). *Botany for Degree students*, S. Chand & Co.Ltd., New Delhi .
3. Pandey, B.P, (2010,) *Modern Practical Botany vol I, II, III*, S.Chand & Company Ltd. New Delhi.

ALLIED BOTANY PRACTICAL I

PRACTICALS

1. Micro preparation of the types prescribed in the syllabus.
2. Identifying the micro slides relevant to the syllabus.
3. Description in technical terms, plants belonging to any of the families prescribed and i of identify the family.
4. 4.Dissection of flower, construction of floral diagram and floral formula
5. To make suitablemicropreparation and identify materials of Algae,Fungi ,
6. Bryophytes ,Pteridophytes, Gymnosperms and Angiosperms.
7. To describe simple experimental set up in Plant Physiology of the syllabus.

REFERENCES

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

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

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

EDUCATION

CHILDHOOD AND GROWING UP –PART – II
(Total: 40 Hrs)

SUBJECT CODE:

COURSE OBJECTIVES

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

1. analyse the concerns of marginalized children
2. understand the adolescent behaviours
3. comprehend the role of play on child development
4. comprehend the role of media on child development
5. examine the impact of urbanization and economic change on child development.

UNIT-I MARGINALIZED CHILDREN: ISSUES AND CONCERNS

Meaning and concept of marginalized children – Children living in urban slum; deprived; socially deprived girls (Dalit and Tribal girls); abused child; children growing up in poverty, street children, HIV affected children and children working in unorganized sectors – child labour - Measures to promote the status of marginalized children.

(Suggested instructional approaches and methods:

i. Presentation of report of the problems of marginalized children based on field study.
ii. Seminar on the problems of marginalized children and the measures to be taken.)

UNIT-II UNDERSTANDING ADOLESCENCE

Meaning of adolescence – study of adolescent behavior in their natural settings – at play or in school settings – using observation, interview schedules, case study method and interacting with them – understanding of the physical, social and moral behaviours of children and adolescents

(Suggested instructional approaches and methods:

i. Teacher talk/ Group discussion on the influences of play on child and adolescent development.
ii. Presentation of report of the adolescent behavior using observation and other techniques.**)**

UNIT-III PLAY AND CHILD DEVELOPMENT

Meaning and characteristics of play - kinds of play and their role in child development – play activities of childhood – factors influencing children's play –contribution of play to children's physical, social, emotional and cognitive development

(Suggested instructional approaches and methods:

a. Teacher talk / Group discussion on kinds of play and child development.
b. Invited lecture by an expert or psychologist on various aspects of children's development.)

UNIT-IV MEDIA AND CHILD DEVELOPMENT

Impact of media on early childhood experiences and development – impact of mass media and social media on adolescent development – Influence of media violence on children's and adolescent's behaviour - effects of media on racial and gender stereotyping – regulating healthy media use

(Suggested instructional approaches and methods:

i. Make a short film on the impact of mass media on children/ adolescents.
ii. Group discussion on media violence on children).

UNIT-V URBANISATION AND ECONOMIC CHANGE ON CHILD DEVELOPMENT

Impact of urban culture, population density, migration of family, and environmental effects (air, water, noise) on child development - effects of liberalization, privatization, and globalization (LPG) on child development with special reference to India.

(**Suggested instructional approaches and methods**:

i. Invited talk/teacher talk on urbanization and child development.
ii. Report presentation based on the group discussion about the impact of liberalization, privatization, and globalization on child development.)

TASKS AND ASSIGNMENTS

1. Contact various socializing agencies and submit a detailed report on their role on child development.

REFERENCES

1. AnithaWoolfolk. (2004). Educational psychology. Singapore: Persion Education.
2. Baron.A. Robert (2000). Pshychology. New Delhi: Prentice-Hall of India.
3. Bert Laura. E. (2014). Child development. New Delhi: PHI Learning.
4. Hurlock, Elizabeth. B. (1980). Development Psychology. New Delhi: McGraw Hill Education.
5. Hurlock, Elizabeth. B. (1980). Adolescent Development. New Delhi: Tata McGraw Hill.
6. Hurlock, Elizabeth. B. (2015). Child development. New Delhi: McGraw Hill Education.
7. Thangasamy, Kokila. (2014). Psychology of learning and human development. Madurai: MaaNila Publisher.
8. www.simplypschology.org
9. psychlassics.yorkn.ca
10. psychology.wikia.com

UNDERSTANDING DISCIPLINES AND SUBJECTS

(Total: 40 Hrs)

SUBJECT CODE:

COURSE OBJECTIVES

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

1. reflect on the role of disciplines and subjects in school curriculum.
2. acquaint with the development of curriculum with social, political and intellectual contexts.
3. understand the paradigm shift in selection of content.
4. analyze the advantages of learner centered curriculum.
5. explore the aspects of life oriented curriculum.

UNIT-I DISCIPLINES AND SUBJECTS

Disciplines and subjects- meaning, definition and concepts – Distinction between school subjects and academic disciplines - Importance of the knowledge of disciplines and subjects - Need and importance of studying school subjects - Curriculum content – meaning, definitions and importance - John Dewey's ideas on disciplinary knowledge and curriculum - Relationship between school subjects and academic discipline

(Suggested Instructional Approaches/ Methods:

i. Teacher talk on meaning and concepts of three different school subjects.
ii. Small group discussion on differences of any three school subjects.)

UNIT-II DISCIPLINES AND SUBJECTS IN SOCIO-CULTURAL PERSPECTIVES

Emergence and development of knowledge, subject and curriculum in social, political and intellectual contexts - Changes in social science, natural science and linguistics - Concepts of knowledge-firm, objective and impersonal-diverse, dialogical, subjective, fluid and porous frame - Redefinitions of school subject from socio-cultural perspectives - School subjects and social justice

(**Suggested Instructional Approaches/ Methods:**

i. Discussion about the historical and cultural influences in any one of your school subjects.
ii. Group discussion on the redefinition of school subject from socio-cultural perspectives.)

UNIT-III SELECTION OF CONTENT

Selection of subject-matter or content of the curriculum: self-sufficiency, significance, validity, interest, utility, learn ability and feasibility - Reasons for inclusion or exclusion of a subject from the school curriculum – Recent developments in school subject.

(Suggested Instructional Approaches/ Methods:

i. Student seminar on selection of content.
ii. Seminar on recent developments in school subjects.)

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UNIT-IV LEARNER ORIENTED CURRICULUM

Disadvantages of discipline oriented Curriculum - Advantages of learner oriented curriculum - Social oriented curriculum for social reconstruction - Designing learner centered curriculum, syllabus and textbooks

(Suggested Instructional Approaches/ Methods:

i. Teacher talk on learner oriented curriculum.
ii. Discussion on the social oriented curriculum for social reconstruction.)

UNIT-V LIFE-ORIENTED CURRICULUM

Life-oriented curriculum – Inter-disciplinary curriculum: the growing need for inter-disciplinary curriculum- Broad field curriculum- Need for curriculum integration - Teaching of science and mathematics for national development - Selection of content- Based on the experiences of children- communities- their natural curiosities- their subjects.

(Suggested Instructional Approaches/ Methods:

a. Discussion on life-oriented curriculum.
b. Student seminar on disciplinary approach to school subjects.)

TASKS AND ASSIGNMENTS

1. Select a unit from your major subject in the school syllabus of any standard and analyze the social, political and cultural influences in it.
2. Critically evaluate the relevance of school subject for social justice and social reconstruction.

REFERENCES

1. Carl, Arend E. (2009). Teacher empowerment through curriculum development. South Africa: Juta and Company.
2. Cullen, Roxanne.,Haris, Michael and Hill, Reinhold, R. (2012). The learnercentered curriculum. San Francisco: Jossey-Boss.
3. Ellis, Arthur K. (2013). Exemplars of Curriculum.New York: Routledge.
4. Hodson. (1987). Science curriculum change in Victorian England: A case study of the Science common things In I Goodson (Ed). Inter National perspectives in curriculum history. Croom Helm.
5. Ivor F. Goodson and Colin J. Marsh (1996). Studying school subjects: A guide.New York: Routledge.
6. Kelly.A.V. (2009) The curriculum: Theory and practice. New Delhi: Sage Publications.
7. Kridel, Craig. (2010). The encyclopedia of curriculum studies. New Delhi: Sage Publications.
8. Leask, Betty. (2015). Internationalizing the Curriculum. New York: Routledge.
9. www.students notes.in/b.ed/…/understand/20school/20/subject.pdf.
10. www.pcer.ac.in/wp_content/uploads/2015/12/ understanding_disciplinesand-school-subjects.pdf.

EPC 1: READING AND REFLECTING ON TEXTS
(Total: 40 Hrs)

SUBJECT CODE:

The aim of this course is to enhance the professional capacities of a student-teacher, specifically reading and writing skills.

COURSE OBJECTIVES

To enable student-teachers:

1. To enhance their capacities as readers and writers by becoming participants in the process of reading.
2. To read diverse texts/books and learn to think together.
3. To use their reading and writing skills for effective preparation for the other courses.

TEACHER/LEARNER ACTIVITIES FOR TRANSACTION OF THE COURSE

To translate these objectives into practice, the teachers in colleges of education should:

1. Engage the student-teachers in reading interactively - individually and in small groups.
2. Offer opportunities to the student-teachers to read wide variety of texts (such as empirical, conceptual and historical texts, policy documents, studies about schools, teaching and learning, texts about people's experiences relating to teaching, learning and schools.
3. Engage the student-teachers in reading the autobiographical narratives, field notes, ethnographies (scientific description of different races cultures), etc. and develop different types of reading skills and strategies
4. Engage the student-teachers in reading expository texts so that they can make predictions, check their predictions, answer question and then summarize or retell what they have read.
5. Engage the student-teachers to analyses various text structures and develop comprehension of them.
6. Engage the student-teachers in developing their writing skill by providing various contexts for writing.
7. Prepare the student-teachers for selected readings and writings required for other courses.
8. Train the student-teachers, through structured tasks, in writing with of sense of purpose and audience and responding to a text with one's own opinion or writing within the context of others' ideas.
9. Train the student-teachers to learn to combine both reading and writing that leads to the development of critical skills.
10. Read any three books related to education and make a critical a presentation.

TASKS AND ASSIGNMENTS:

Preparing a Record on "Reading and Reflecting on Texts".

1. Every student-teacher should prepare and submit a comprehensive record of the reading writing activities done throughout the course for his/her teacher's feedback and evaluation.
2. Read any three books related to education and submit a review of them.

RECOMMENDED BOOKS FOR READING AND REFLECTING

1. வரதராசன், மு. (1979). கல்வி. சென்னை: பாரிநிலையம்
2. அமனஷ்வீலி. (2006). குழந்தைகளின் எதிர்காலம். சென்னை: அறிவுப் பதிப்பகம். (044 2848 2441.∴2848 2973).
3. உதயமூர்த்தி,எம்.எஸ்.(2015). வெற்றிக்கு முதல் படி. சென்னை: கங்கை புத்தக நிலையம் (044 - 2434 2810).
4. அப்துல் கலாம்,ஆ.ப.ஜெ. (2006). கலாமைக் கேளுங்கள். சென்னை: நியூசெஞ்சுரிபுக்ஹவுஸ் (044 - 2625 8410).
5. சுவாமிவிவோனந்தர். (1997). புதிய இந்தியாவைப் படைப்போம். சென்னை:ஸ்ரீராமகிருஷ்ண மடம்.
6. கோகிலாதங்கசாமி.(2016). சிறந்தஆசிரியராக. சென்னை: பாவைபதிப்பகம்,(9443323840).
7. சோமவள்ளியப்பன். (2013). நல்லதாகநாலுவார்த்தை. சென்னை: ஆப்பிள் பப்ளிஷிங் இணடர் நேஷனல், (044 -32440099.∴33464677).
8. அழகியநாதன்,எம்.பி.(2008). அறிவுலகமேதைஆல்பர்ட் ஐன்ஸ்டீன். சென்னை:அறிவுப் பதிப்பகம். (044 -2848 244.∴2848 2973).
9. ஜெயசீலன்,சூ.ம.(2015). இதுநம் குழந்தைகளின் வகுப்பறை. சென்னை: அரும்பு பதிப்பகம். (94870 36865 ∴ 90429 82821)
10. குப்புசாமி.பி.ச.(2015). ஓர் ஆரம்பப் பள்ளிஆசிரியரினின் குறிப்புகள்: கோவை: விஜயா பதிப்பகம், (0422-2382614).
11. நடராஜன் ஆயிஷா. (2013). இது யாருடைய வகுப்பறை? சென்னை: புக்ஸ் ∴பார் சில்ரன், (044 -2433 2424)
12. சுவாமி மூர்த்தானந்தர். வி. (2015) ஆசிரியர்களே அச்சாணிகள். சென்னை: ஸ்ரீராமகிருஷ்ண மடம் (email: mail@chennaimath.org).
13. இறையன்பு.வெ. (2008). ஏழாவது அறிவு. சென்னை: நியூசெஞ்சுரி புக்ஹவுஸ் (044 - 2625 8410 ∴ 2625 1968).
14. கமலா கந்தசாமி. (2012). சீனத்து ஞானிகள்.∴புஷியஸ் சிந்தனைகள். சென்னை: நர்மதாபதிப்பகம், (98402 26661).
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16. ஸ்ரீதர். (2015). ஒரு பிடி மண்.சென்னை: விஜயா பப்ளிகேஷன்ஸ் (044-2481 0501).
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18. Arden, Paul (2003). It's not how good you are, its how good you want to be.New York: Phaidon (www.phaidon.com).
19. Dyer, W.Wayne. (2005). Co-creating at its best. Australia: Hay House of India. (email: contact @hayhouse.co.in).

SEMESTER - II

20. Goldsmith, Marshall(2013). What got you here, won't get you there. London: Profile Book. (www.profilebooks.com).
21. Jayaraman, Chindhai. (2007). Turtles in Schools. Chennai: Vinodh Publishers (044 - 2639 0525).
22. Kokila Thangasamy, (2010). 100 Inspirational Quotes for Teachers. Gandhigram: Anichum Blooms, (90033 58873).
23. Shiv Khera. (2014). Freedom is not free. New Delhi: Bloomsbury Publishing India, (www.bloomsbury.com).
24. Swami Sachidananda Bharathi. (2013). The Second Freedom of Struggle. Nagpur: Navastrugsti Publications (086005 67232 / 091201 37984).