

## DEPARTMENT OF SHIP

## SEMESTER-I

HCS101	ENGLISH – I	L	T	P	C
		4	0	0	4

## VOCABULARY COMPETENCIES

Alphabets - General Words - Words used in daily life (functional Language) - Syllabication - Opposites - Singular, Plural - Nouns - Verbs - who, where.... Question forms

## GRAMMATICAL COMPETENCIES

Tense - forms of verbs - Sentences / Phrases - jumbled and meaningful sentences - Subject - Predicate - Kinds of Sentences - Cursive Writing -Vowels – Articles – Gender – Young ones – Animal sounds.

## GRAMMATICAL COMPETENCIES

Simple Comprehension Passage – Picture Composition – Letter Writing(formal) – Framing Questions-Adverbs –Adjectives – Prose “Bon Voyage”- Preposition – Comprehension Passage – Abbreviations – Sentence pattern – Prefix – Suffix.

## READING COMPETENCIES

Prose exercise continued –Homophones –Compound Word Formation –Developing Hints – Answering simple questions – Translation from Tamil to English – Greeting Notes – Tense Forms – Pronouns – kinds of pronouns –Comprehension Passage.

## LITERARY CREATIVE WRITING

Poem – Join these sentences – One word for many - Responding to advertisement – Filling up of forms – Comparison of adjectives – Auxiliary verbs – Transitive & Intransitive Verbs – Letter Writing (informal) Kinds of Adverbs & Adjectives – Comprehension (poem)- Creative writing (picture \object composition) – Identify the mistakes (words & sentence )

## TEXT BOOKS

Higher Secondary, First year Volume-I.Nalini Parthiban,PriscillaJosephine Sarah,Dr.A.josephDorairaj,NirmalaJairaj,S.Muthukrishnan,K.V.Ranganathan,Tamilnadu Textbook Corporation

## REFERENCE BOOK

English Grammar, Wren &Martin

<b>HCS102</b>	<b>MATHEMATICS – I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**MATRICES AND DETERMINANTS:**

Matrix Algebra – Definitions, types, operations, algebraic properties, Determinants – Definitions, properties, evaluation, factor, method, product of determinants, co-factor determinants

**VECTOR ALGEBRA**

Definitions, types, addition, subtraction, scalar multiplication properties, position vector, resolution of a vector into two and three dimensions, direction cosines and direction ratios.

**ALGEBRA**

Partial fractions – Definitions, linear factors repeated, non-repeated, quadratic factors – non-repeated permutation, circular permutation, combinations Mathematical Induction – binomial theorem for positive integral index – finding middle and particular terms.

**SEQUENCES AND SERIES**

Definitions, special types of sequences and series Binomial theorem for rational number other than positive integer, Binomial series, approximation, summation of Binomial series Exponential series, logarithmic series.

**ANALYTICAL GEOMETRY**

Locus, straight lines – normal, parametric, general form perpendicular distance from a point, family of straight lines angle between two straight lines, pair of straight lines circle – general equation, tangent equation, family of circles.

**TEXT BOOK:**

Higher Secondary– First year Volume I, Dr.E.Chandrasekeran, Dr.C.Selvaraj, R.Swaminathan, D.Murugesan, Dr.Devaraj, T.M. Soundrarajan, N.Rajendran, Tamilnadu text book corporation

**REFERENCE BOOK:**

Fundamental Mathematics. Dr.S. Arumugam

<b>HCS103</b>	<b>PHYSICS – I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**PHYSICAL MEASUREMENTS**

Physics, Technology and Society – Force – Classification of force – Unit – SI Unit – Fundamental and Derived quantities – SI standards – Rules for SI Unit writing – Significant Figures – Error and Type of Error – Dimensional Analysis – Uses and Limitations of Dimensional analysis.

**KINEMATICS**

Speed – Velocity – Acceleration – Equations of motion – Vector – Addition, Subtraction and Multiplication of Vectors – Triangle and Parallelogram Law of Vectors – Lami's Theorem – Newton's I & II & III Law – Collision – Elastic Collision.

**DYNAMICS OF ROTATIONAL MOTION**

Centre of Mass – Centre of Gravity – Equations of Rotational Motion – Inertia – Parallel Axes Theorem – Perpendicular Axes Theorem – Moment of Force – Couple – Torque.

**GRAVITATION AND SPACE SCIENCE**

Universal Gravitational Law – Variation of Acceleration due to Gravity –  $g$  with depth –  $g$  with altitude –  $g$  with latitude – Gravitational Field – Intensity and Potential difference – Potential – Escape Speed.

**MECHANICS OF SOLIDS AND FLUIDS**

Stress – Strain – Hooke's Law – Three Moduli of Elasticity – Pascal Law – Stroke's Law – Poiseuille's Equation – Bernoulli's Theorem.

**Text Book:**

Higher Secondary-Second year, S.Ponnusamy, S.Rasarasan, Girija Raman jam, P.Loganathan, Dr.N.Vijayan, Dr.Hemamalini Rajagopal, Tamilnadu Textbook Corporation

**REFERENCE BOOKS:**

1. A Second course in Elementary Physics, C.S.Karve and G.Z.Shah, S.Chand & Co. (1975).
2. College Physics, R.L.Weber, K.V.Manning, M.W.White and G.A.Weyg, Tata McGraw Hill (1977).
3. University Physics, H.D.Young, M.W. Zemansky and F.W. Sears, Narosa Publications House (1982).
4. Jr, Mechanics for engineers – Dynamics IV Edition Ferdinand P. Beer, E. Russell Johnston., McGraw Hill (1977).
5. Properties of Matter Brijlal and Subramanian, Eurasia Publishing House (Pvt.)Ltd. (1985).

<b>HCS 104</b>	<b>CHEMISTRY-I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**CHEMICAL CALCULATION**

Scientific figures – SI units – calculation of formula weight – Avogadro's number – calculation of empirical formula from quantitative analysis and percentage composition – calculation of molecular formula from empirical formula – oxidation Reduction – Methods of expressing concentration of solution – Determination of equivalent mass of an element by chloride method

**GENERAL INTRODUCTION TO METALLURGY**

Ores and minerals – sources from earth – Metallurgical process – Roasting – oxidation – Smelting – reduction – Purification of metals – Electrolytic refining of copper.

**ATOMIC STRUCTURE**

Brief Introduction of history of structure of atom – Electronic configuration and quantum numbers – orbital – shapes of **s** and **p** orbital – Paul's exclusion principle – Hund's rule – Aufbau principle – energy levels and filling of orbital.

**PERIODIC CLASSIFICATION AND INTRODUCTION TO S AND P BLOCK ELEMENTS**

Brief history of periodic classification – IUPAC periodic table – Electronic configuration of ions – Atomic radius – Electron affinity – group – **s** and **p** block elements – General characteristics of **s** elements – general characteristics of **p** elements – properties of **s** and **p** block elements – Isotopes of hydrogen – preparation of Tritium – uses of tritium-property of tritium- Uses of hydrogen peroxide -metals and non metals-water and heavy water.

**THE SOLID STATE AND GASEOUS STATE**

Classification of solids – unit cell –NaCl–CsCl- Four important measurable properties of gases – gas laws and ideal gas equation – calculation of gas constant R – Methods of liquefaction of gases

Textbook:

**TEXTBOOK:**

Higher Secondary-First year- Volume-II, Dr.S.P.Meenakshi sundran, Dr.R.Ramesh, T.Vijayarajan, Dr.S.Merlin Stephan, Dr.K.Sathyanarayanan, Dr.M.Rajalakshmi, Tamilnadu Textbook Corporation

**REFERENCES:**

- 1, General chemistry, John Russell McGraw hill international Editions – 3 rd Edition
2. Inorganic chemistry, P.L. Soni

**SEMESTER-II**

HCS 201	ENGLISH-II	L	T	P	C
		4	0	0	4

**GRAMMATICAL COMPETENCIES**

Revision of nouns, verbs, pronouns, prepositions, adverbs & adjectives –Combine sentences with relative pronouns and link words - Comprehension passage.

**READING & WRITING COMPETENCIES**

Active and passive voice – Guided composition - Abbreviations – Homophones – Revision of tense forms – simple tense forms – continuous tense forms (past, present and future)

**READING & WRITING COMPETENCIES**

Prose –“The Farmer”-exercise followed – Develop the following hints into a paragraph – fill in the blanks with the given phrasal – Word building.

**OCUPATIONAL-JOB SKILLS-LITERARY COMPETENCIES**

Complete the given letter of application for a post or job (responding to an advertisement) -Poetry Comprehension – Sentence pattern (identification).Fill in the blanks with correct tense forms.

**GRAMMAR & CREATIVE COMPETENCIES**

Poem - The Solitary Reaper – exercises – Comparison of Adjectives (contd) – Compound Word formation – General Essay (guided composition).

**TEXT BOOKS**

Higher Secondary, First year Volume-I.Nalini Parthiban, Priscilla Josephine Sarah, Dr.A.josephDorairaj, NirmalaJairaj, S.Muthukrishnan, K.V.Ranganathan, Tamilnadu Textbook Corporation

**REFERENCE BOOK**

English Grammar, Wren & Martin

HCS 202	MATHEMATICS-II	L	T	P	C
		3	1	0	4

**TRIGONOMETRY:**

Trigonometrically ratios, signs, compound angles  $A \pm B$ , multiple angles, transformation of a product into a sum of difference, trigonometrically equations, properties of triangles, solution of triangles inverse trigonometrically functions.

**FUNCTIONS AND GRAPHS**

Constants, variables, intervals, neighborhood of a point, Cartesian product, relation. Function – graph of a function, vertical line test, Types of functions, Quadratic in equation Domain and range.

**DIFFERENTIAL CALCULUS**

Limit of a function – concept, important limits continuity of a function – at a point, in a interval, discontinuous function. Differentiation techniques – standard formulae, product, quotient, chain rules, implicit function, third order derivatives.

**INTEGRAL CALCULUS**

Concept, integration of linear, methods of integration – decomposition method, substitution method, integration by parts Definite integrals – integration as summation, simple problems.

**PROBABILITY**

Classical definitions, axioms, basic theorems, conditional probability, total probability of an event, Bayer's theorem – simple problems.

**TEXT BOOK:**

Higher Secondary Firstyear Volume  
 II, Dr. E. Chandrasekeran, Dr. C. Selvaraj, Dr. Felbin C. Kennedy, Dr. Thomas  
 rosy, R. Swaminathan, R. Janaki, K. G. Pushpavalli, Tamilnadu Text book Corporation

**REFERENCE BOOKS:**

Fundamental Mathematics By Dr. S. Arumugam

HCS 203	PHYSICS – II	L	T	P	C
		4	0	0	4

**OSCILLATIONS**

Simple Harmonic Motion – Important Terms in Simple Harmonic Motion – Simple Pendulum – Types of Oscillations – Law of Conservation of Energy.

**WAVE MOTION**

Mechanical Wave Motion – Important Terms – Super Position Waves – Sonometer – Interference Waves – Doppler Effect and its Applications.

**HEAT AND THERMODYNAMICS**

Kinetic Theory of Gases and Postulates – Law of Thermodynamics – Mayer’s Theory – Wien’s Displacement Law – Stefan’s Law.

**RAY OPTICS**

Relationship between  $u, v$  &  $f$  for Spherical mirror – Concave Mirror – Real Image – Convex Mirror – Virtual Image – Magnification – Total Internal Reflection – Len’s Maker’s Formula – Prism – Refraction & Dispersion of Spectrometer.

**MAGNETISM**

Basic Property of Magnet – Tangent Law – Magnetic Property of Materials – Classification of Magnetic Materials – Dia, Para & Ferro Magnetic Material

**Text Book:**

Higher Secondary-First year, Volume-II, S.Ponnusamy, S.Rasarasan, Girija Raman jam, P.Loganathan, Dr.N.Vijayan, Dr.HemamaliniRajagopal, Tamilnadu Textbook Corporation

**REFERENCE BOOKS:**

1. A Second course in Elementary Physics C.S.Karve and G.Z.Shah, S.Chand & Co. (1975).
2. Advanced Level Physics M. Nelkon and P.Parker, 7th Edition Arnold Heinemann (1995).
3. Fundamental of Physics, David Haliday Robert Resnick and Jeart Walker, **John** Wiley (1975).
4. Fundamental of Optics, D.R. Khanna and H.R. Gulati, R. Chand & Co. (1984).
5. General Physics, Merton M.Sterheim and Joseph W.Kane, John Wiley (1967).

<b>HCS 204</b>	<b>CHEMISTRY-II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**CHEMICAL BONDING**

Elemental Theories on chemical bonding – Octet rule – Types of bond – Ionic bond – lattice energy and calculation of lattice energy using Born – Haber cycle – covalent bond – VSEPR Model

**COLLIGATIVE PROPERTIES**

Concept of colligative properties and its scope- Beckmann method – osmotic pressure – laws of osmotic pressure – Berkley – Hartley’s method

**THERMODYNAMICS – I**

Thermodynamics – S cope – Terminology used in Thermodynamics – Internal energy - Enthalpy – Enthalpy of formation – Enthalpy of vaporization – Various sources of energy

**ORGANIC CHEMISTRY**

Basic concepts of organic chemistry -catenation – classification of organic compounds  
Functional groups – nomenclature - Isomerism – Types of organic reactions– carbonium - carbanion

**ORGANIC CHEMISTRY**

Purification of organic compounds- Characteristics of organic compounds – crystallization – fractional crystallization – sublimation – Distillation – fractional Distillation – steam distillation – chromatography

**TEXTBOOK:**

Higher Secondary-First year- Volume-II, Dr.S.P.Meenakshi sundran, Dr.R.Ramesh, T.Vijayarajan, Dr.S.Merlin Stephan, Dr.K.Sathyanarayanan, Dr.M.Rajalakshmi, Tamilnadu Textbook Corporation

**REFERENCES:**

1. Physical chemistry, Lewis and Glass tone
2. Organic chemistry, Bahl

**FIRST YEAR – PRACTICAL**

<b>HCS 205</b>	<b>PHYSICS LABORATORY - I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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1. To find the thickness of the material of a given rod with the help of Screw Gauge.
2. To find breadth of the given scale with the help of Vernier Caliper.
3. Simple Pendulum – To determine the acceleration due to gravity.
4. To determine the coefficient of viscosity by Poiseuille's Flow Method.
5. To Verify the Snell's Law by using Rectangular Prism.
6. To determine the coefficient of viscosity of a given viscous liquid by measuring the Terminal Velocity of a given spherical body.
7. To determine the focal length of Concave Mirror.

HCS 206	CHEMISTRY LABORATORY-I	L	T	P	C
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1. Knowledge on looking into Clarke's table

2. Qualitative analysis

#### A. IDENTIFICATION OF ACID RADICALS

- 1) Carbonate
- 2) Chloride
- 3) Nitrate
- 4) Sulphate

#### B. IDENTIFICATION OF BASIC RADICALS

- 1) ammonium
- 2) lead
- 3) copper
- 4) aluminum
- 5) zinc

#### C. IDENTIFICATION OF SALT

- 1) copper sulphate
- 2) zinc chloride

**SEMESTER-III**

<b>HCS 301</b>	<b>ENGLISH-III</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**VOCABULARY AND GRAMMATICAL CATEGORIES**

Vocabulary – lexical competencies – abbreviations and acronyms –grammatical functions; blending words, compound words, clipping, compound word formation  
reading competency – comprehension

**GRAMMATICAL CATEGORIES**

Grammatical competencies; preposition, link word, suitable verb form, sentence pattern, combine the sentences, simple, compound and complex sentences, writing competencies; Prose, To the Land of snow – Hiroshima

**LITERARY CATEGORIES**

Literary competencies; Poem ‘Women’s Rights’ ‘snake checklist – note making – who make notes? When to make notes? How to make notes

**OCCUPATIONAL AND STRATEGIC CATEGORIES**

Occupational competencies; summary writing, responding to Advertisement , strategic competencies; non lexical fillers creative competency ; slogans

**TRANSCODING CATEGORIES**

Transcoding bar graph, line graph, and curved graph – pie graph data table – tree diagram

**TEXT BOOKS**

Higher Secondary, First year Volume-Inline Parthian, Priscilla Josephine Sarah, Dr.A.josephDorairaj, NirmalaJairaj, S.Muthukrishnan, K.V.Ranganathan, Tamilnadu Textbook Corporation

**REFERENCE BOOK**

Knud Suhibsbye – A modern English Grammar oxford University Press, London 1989

Hornby, A.S.The teaching of structured words and sentence pattern – Oxford University Press.London, 1969

Geoffrey Bernard, Beller spoken English – Macmillan & co London 1969,maerk  
Luester.Introductory Transformational grammar of English, Macmillan 1977

HCS 302	MATHEMATICS-III	L	T	P	C
		3	1	0	4

### APPLICATIONS OF MATRICES AND DETERMINANTS:

Ad joint, inverse – properties, computations of inverses solution of system of linear equations by matrix inversion method, Rank of a matrix – Elementary transformation on a matrix, consistency of a system of linear equations, Cramer’s rule, non-homogenous equations, homogeneous linear system, rank method.

### VECTOR ALGEBRA I

Scalar product – Angle between two vectors, properties of scalar product, applications of dot products. Vector product, product of three vectors, scalar triple product, vector triple product, product of four vectors.

### VECTOR ALGEBRA II

Lines – equation of a straight line, angle between two lines skew lines – shortest distance between two lines, condition for two lines to intersect, point of intersection, co linearity of 3 points. Planes – equation of a plane, sphere – equation of sphere.

### COMPLEX NUMBERS

Complex number system – conjugate, modulus, addition, subtraction, product, quotient, solutions of polynomial equation, De Moivre’s theorem and its applications Roots of a complex number – nth roots, cube and fourth roots.

### ANALYTICAL GEOMETRY

Definition of a conic – general equation of a conic standard equation, the process of shifting the origin of parabola, ellipse, hyperbola. Asymptotes, Rectangular hyperbola.

### TEXT BOOK:

Higher Secondary – Second year – Volume I, Priscilla Josephine Sarah, Dr.Premalatharajan, Sankara Subramanian, Dr.A.Joseph Dorairaj, NaliniParthiban, Tamil nadu Textbook Corporation

### REFERENCE BOOKS:

Basic Maths, Dr. S. ARUMUGAM

<b>HCS 303</b>	<b>PHYSICS – III</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**ELECTROSTATICS**

Coulomb's law– electric field-electric field due to a point charge– electric field lines– electric potential-potential difference – Equipotential surfaces– electric flux-Gauss's theorem– field due to infinitely long straight wire– Electrostatic induction-capacitor and capacitance – capacitors in series and in parallel

**CURRENT ELECTRICITY**

Electric current – Ohm's law – electrical resistivity and conductivity– Classification of materials in terms of conductivity– combination of resistors– temperature dependence of resistance – potential difference and emf of a cell – Kirckoff's law – wheat stone's bridge, potentiometer – electric power – chemical effect of current

**EFFECTS OF ELECTRIC CURRENT**

Joule's law – thermocouple – thermopiles – magnetic effect of current – Biot Savart law – Moving coil galvanometer – Ampere's circuital law – conversion of galvanometer to ammeter and voltmeter

**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT**

Electromagnetic induction, faraday's law – Lenz's law – self induction – Mutual induction – eddy current – transformer – long distance transmission – alternating current – LCR series circuit – resonance

**ELECTROMAGNETIC WAVES AND WAVE OPTICS**

Electromagnetic waves and their characteristics – emission and absorption spectrum – theories of light – Scattering of light – Interference – diffraction polarization of light waves

**Text Book:**

Higher Secondary-First year, Volume-II, S.Ponnusamy, S.Rasarasan, Girija Raman jam, P.Loganathan, Dr.N.Vijayan, Dr.HemamaliniRajagopal, Tamilnadu Textbook Corporation

**REFERENCE BOOKS:**

1. Modern Physics, R.Murugesan, L.S.Publications(1996)
2. Electricity and Magnetism, D.C.Tayal, Himalaya Publishing House(1998)
3. Fundamental of Optics, D.R. Khanna and H.R. Gulati, R. Chand & Co. (1984).
4. College Physics, R.L.Weber, K.V.Manning, M.W.White and G.A.Weyg and, Tata McGraw Hill (1977).

HCS304	Chemistry-III	L	T	P	C
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### ATOMIC STRUCTURE-II and PERIODIC CLASSIFICATION

Dual properties of electrons – de Broglie relation – Thomson's experiment – shapes of orbital – Metallic bond – Difference between Metallic bond and covalent bond – Difference between Metallic bond and Ionic bond – Inter molecular forces – Hybridization – Types of Hybridization- ionization energy – Factors affecting electron affinity.

#### P- BLOCK ELEMENTS:

Group 13 elements – Potash alum -Group 14 elements – Silicates and its uses -Metallurgy of Lead – Extraction – Purification – Physical and chemical properties -Group 15 elements – Phosphorus – Comparison of white and Red Phosphorous – uses – Group 16 elements – Sulphuric acid – Physical, chemical properties of sulfuric acid – uses – Group – 17 – elements – Group – 18 elements

#### D and F – BLOCK ELEMENTS

First transition series – occurrence and principles of extraction – copper – Alloys of copper – second transition series – occurrences and principles of extraction of silver – Third transition series – occurrence -Lanthanides and actinides- Uses of Lanthanides and actinides.

#### NUCLEAR CHEMISTRY

Nuclear energy – Nuclear fission and fusion – Radio carbon dating – Nuclear reaction in sun – uses of radioactive isotopes – Half-life period – Determination of Half-life period.

#### THERMODYNAMICS II

Review of 1<sup>st</sup> Law – Need for the II law of Thermodynamics -spontaneous and non spontaneous processes – Entropy – Gibb's free energy – Applications-problems on entropy- Third law of Thermodynamics

#### TEXTBOOKS

Higher secondary second year–chemistry volume I, N.Kalavathy, R.C.Saraswathy, Dr.V.Narayanan, Dr.K.Sathyanarayanan, Tamilnadu Text Book Corporation

#### REFERENCES:

1. Advanced Inorganic Chemistry , P.L.Soni
2. Physical chemistry ,Louis & Glau ston

**SEMESTER-IV**

<b>HCS 401</b>	<b>ENGLISH-IV</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**VOCABULARY AND GRAMMATICAL CATEGORIES**

Vocabulary – lexical competencies: synonyms, antonyms, idioms, Phrasal verbs  
 American spelling, Grammatical competencies; modal verbs, relative pronoun, passive voice, report the dialogue

**READING AND OCCUPATIONAL CATEGORIES**

Reading competency; comprehension, reading; developing hints, choosing the correct answer, occupational competency; summary uniting, responding to advertisement

**CREATIVE AND STRATEGIC CATEGORIES**

Creative competency; Proverbs, learning competency; error spotting, strategic competency; Roadmap, train in spoken English, A letter calling for quotation, A letter for placement order, A letter for complaint.

**WRITING CATEGORIES**

Writing competency; Prose ‘The ceaseless crusader’ ‘Julius Caesar’ answering annotations, essay questions, paragraph questions, reading, listening, speaking and writing skills developing

**LITERARY CATEGORIES**

Literary competency; Poem ‘The man he killed’ ‘The nation united’ making them appreciate the poem and understand the poem and enjoy the rhythmical reading.

**TEXT BOOKS**

Higher Secondary, First year Volume-I. Nalini Parthian, Priscilla Josephine Sarah, Dr. A. Joseph Dorairaj, Nirmala Jairaj, S. Muthukrishnan, K. V. Ranganathan, Tamilnadu Textbook Corporation

**REFERENCE BOOKS**

Tickoo communication skills in English LTAI 1998  
 Gillian Brown .Listening to Spoken English Longman 1977  
 Homby, A.S. The teaching of structural words and sentence pattern, oxford University Press London 1969  
 English for Engineers. Dr. G. Manivannan Govi Publication  
 Text book prescribed for standard xi xii Tamilnadu text book society, Chennai

HCS 402	MATHEMATICS-IV	L	T	P	C
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### DIFFERENTIAL CALCULUS – APPLICATIONS

Derivative as a rate measure, mean value theorem, Role's theorem, Lagrange's Mean value theorem – Taylor's and Maclaurin's series L' Hospital's Rule, concavity, convexity, points of inflexion.

### DIFFERENTIAL CALCULUS – APPLICATIONS II

Errors and approximations – absolute, relative, percentage errors, partial derivatives – Euler's theorem.

### INTEGRAL CALCULUS AND ITS APPLICATIONS

Properties of definite integrals, reduction formulae for  $\sin^n x$  and  $\cos^n x$ , Area, length, volume and surface area.

### DIFFERENTIAL EQUATIONS

Formations of differential equation, order and degree, solving differential equation (1<sup>st</sup> order) – variable separable, homogeneous linear equations, second order linear equations with constant coefficients,  $f(x) = e^{mx}$ ,  $\sin mx$ ,  $\cos mx$ ,  $x$ ,  $x^2$ .

### ANALYTICAL GEOMETRY

Random variable, probability density function, distribution function, mathematical expectation, variance discrete distribution – Binomial, Poisson, continuous distribution – Normal distribution.

### TEXT BOOK:

Higher Secondary – Second year – Volume I, Priscilla Josephine Sarah, Dr.Premalatharajan, Sankara Subramanian, Dr.A.Joseph Dorairaj, NaliniParthiban, Tamil nadu Textbook Corporation

### REFERENCE BOOKS:

Basic Maths Dr. S.Arumugam

HCS403	PHYSICS – IV	L	T	P	C
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**ATOMIC PHYSICS**

Atomic structure – specific charge of the electron – Rutherford’s atom model X-rays – Bragg’ law – Bragg’s X-ray spectrometer – Maser and Laser –Types of Laser – Ruby laser – He-Ne laser – Holography

**DUAL NATURE OF RADIATION AND MATTER-RELATIVITY**

Photoelectric effect – Einstein’ photoelectric equation – Matter waves Concept of space – mass, time, special theory of relativity

**NUCLEAR PHYSICS**

Nuclear properties – nature of nuclear forces – Radioactivity-alpha, beta and gamma radiations – Radio isotopes – nuclear fission and fusion

**SEMICONDUCTOR DEVICES AND THEIR APPLICATIONS**

Semiconductor theory – P-N junction diode – Zener diode – LED – LCD – junction transistors – Logic gates – NOT – OR – AND – EXOR using discrete components, NAND and NOR gates universal gates

**COMMUNICATION SYSTEMS**

Types of Modulation – Demodulation – Radio transmission communication – Radio transmission reception – T.V. transmission – T.V. reception – Digital Communications.

**Text Book:**

Higher Secondary-First year, Volume-II,S.Ponnusamy, S.Rasarasan, Girija Raman jam, P.Loganathan, Dr.N.Vijayan, Dr.HemamaliniRajagopal, Tamilnadu Textbook Corporation

**REFERENCE BOOKS:**

1. Modern Physics, R.Murugesan,L.S.Publications(1996)
2. Fundamentals of Physics, David Haliday, Robert Resnick and Jeart Walker, John Wiley(1977).
3. Concept of Physics, H.C.Varma, Bharathi Bhavan Publishers (2003).
- 4 . Advanced Physics, Keith, Gibbs, Cambridge University Press (1996)

HCS404	CHEMISTRY-IV	L	T	P	C
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**ISOMERISM IN ORGANIC CHEMISTRY**

Geometrical isomerism – Conformation of cyclic compounds – Optical isomerism – Optical activity – Chirality's – Compounds containing chiral centers – D – L – and R – S notation

**ELECTROCHEMISTRY**

Electrochemistry- types of reaction-dissociation constant-pH indicators-Arrhenius theory-Faraday's Law- construction of cells- SHE- Nerst equation-complete electrochemical cell representation

**CHEMICAL KINETICS-II and SURFACE CHEMISTRY**

Order and rate of reactions –derivation of expression for rate constant- half life period-graphical method for determining order and rate constant- simple and complex reactions-adsorption-catalysis-colloids-emulsions

**CARBONYL COMPOUNDS, CARBOXYLIC ACID**

Nomenclature – Isomerism – General methods of preparation – Aldol condensation – characteristic of Aldol condensation – Addition of oxidation reaction. Aromatic aldehydes – Preparation – comparison – uses. Ketones – Preparation – Properties – comparison of aldehyde of Ketone – Nomenclature– Preparation– Mechanism of esterification –Carboxylic acid – Monohydroxy carboxylic acid –Dicarboxylic acid – Preparation- Strength – physical and chemical properties

**ORGANIC NITROGEN COMPOUNDS / BIOMOLECULES**

Aliphatic Nitro compounds – Isomerism – Preparation – Aromatic Nitro compounds – Properties – Carbohydrates – Types – Structure – Proteins – Classification – structure Amino acids – Nucleic acids – function – Lipids – Function.

**References:**

1. Higher secondary second year –chemistry volume II
2. Biochemistry by Leninger
3. Organic chemistry by Morrison & Boyd

<b>HCS 405</b>	<b>PHYSICS PRACTICAL – II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		0	0	3	1

1. To determine the wave length of the spectrum by using Grating with Spectrometer.(By assuming N)
2. Calibration of ammeter using potentiometer
3. To find the frequency of the Tuning Fork using a Sonometer wire.
4. To draw the characteristic curve of a p-n junction diode in forward bias and to determine its forward resistance.
5. To determine acceleration due to gravity by Compound Pendulum.
6. To verify Ohm's Law
7. To check resistance, capacitance by using Multimeter.

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		0	0	3	1

**Practicals**

1. Volumetric analysis
  - a. Permanganometry
  - b. Dichrometry