
ST. TERESA'S COLLEGE, ERNAKULAM
(AUTONOMOUS)

Affiliated to Mahatma Gandhi University, Kottayam



CURRICULUM FOR
BACHELOR'S PROGRAMME
IN CHEMISTRY

Under Choice Based Credit & Semester System
& Outcome Based Education

(2018 Admissions)

BCHE- B.Sc. CHEMISTRY
PROGRAM SPECIFIC OUTCOMES

PSO1: Describe the major concepts and theoretical principles in Chemistry

PSO2: Solve problems using basic understandings in chemistry, physics and mathematics

PSO3: Apply scientific knowledge to design, perform, record and analyze experiments

PSO4: Develop communication skills to identify, investigate, formulate and transmit new ideas and concepts

PSO5: Develop analytical, creative, cognitive skills with social responsibility and environmental consciousness

SEMESTER I

Course Code	Course Title	Credits	Course Type
EN1A01B18	Fine-tune Your English	4	Common Course I
EN1A02B18	Pearls from the Deep	3	
MA1A01B18	Kathasahithyam	4	Common Course II
HN1A01B18	Kahaani Aur Upanyas		
FR1A01B18	French Language and Communicative Skills-I		
MT1C01B18	Calculus	3	Complementary Course I
PH1C02B18	Properties of Matter & Thermodynamics	2	Complementary Course II
CH1B01B18	General and Analytical Chemistry	2	Core course

SEMESTER I

COMMON COURSE I

EN1A01B18– FINE TUNE YOUR ENGLISH

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Recognize the basics of English grammar

CO2: Choose the appropriate word classes

CO3: Identify common errors in the use of English language in various contexts

CO4: Apply the rules of grammar to comprehend, speak, and write grammatically correct English

CO5: Compose materials for business communication

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	1	1	3	2
CO3	1	1	1	2	2
CO4	1	1	1	3	2
CO5	1	1	1	2	2

Syllabus Content:

Module I

(18 Hours)

The Sentence and its Structure

How to Write Effective Sentences – Phrases:What are They? – The Noun Clauses – The Adverb Clause – “If All the Trees Were Bread and Cheese” – The Relative Clause – How Clauses are Conjoined

Module II

(18 Hours)

Word-Classes and Related Topics

Understanding the Verb – Understanding Auxiliary Verbs – Understanding Adverbs –
Understanding Pronouns – The Reflexive Pronoun – The Articles I – The Articles II – The
Adjective – Phrasal Verbs – Mind your Prepositions

Module III

(18 Hours)

To Err is Human

Concord – Errors – Common and Uncommon

Spelling and Pronunciation

Pronunciation: Some Tips – More Tips on Pronunciation – An awesome Mess? – Spelling Part II

Module IV

(18 Hours)

Tense and Related Topics

'Presentness' and Present Tenses – The 'Presentness' of a Past Action – Futurity in English –
Passivisation

Interrogatives and Negatives

Negatives – How to Frame Questions – What's What? – The Question Tag

Module V

(18 Hours)

Conversational English

Some time expressions – Is John There Please?

Miscellaneous and General Topics

Reading

Letter Writing

In addition there will be an essay question on a general topic.

SEMESTER I

COMMON COURSE I

EN1A02B18– PEARLS FROM THE DEEP

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO1: Name prominent literary figures and recognize various literary devices

CO2: Analyze inherent themes and motives

CO3: Identify the nuances of the age in which the literary work was written

CO4: Examine the different aspects of theatre

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	1	1	3	2
CO3	1	1	1	3	2
CO4	1	1	1	3	2

Syllabus Content:

Module 1 (Fiction)

(18hours)

Ernest Hemingway: The Old Man and the Sea

Module 2 (One Act Plays)

(18hours)

Susan Glaspell: Trifles

Asif Currimbhoy: The Refugee

A.A Milne: The Boy Comes Home

Module 3 (Short Stories)

(18hours)

Guy De Maupassant: Two Friends

O. Henry: The Gift of Magi

K.A Abbas: Sparrows

Flora Annie Steel: Valiant Vicky, the Brave Weaver

Module 4 (Poems)

(18hours)

Rumi: The Chance of Humming

Walter Scott: Lochinvar

John Keats: La Belle Dame Sans Mercy

Robert Frost: After Apple Picking

Chinua Achebe: Refugee Mother and Child

Kamala Das: My Grandmother's House

Ted Hughes: Jaguar

Pablo Neruda: Tonight I can Write the Saddest Lines

P.P Ramachandran: How Simple It Is!

SEMESTER I

COMMON COURSE II

MA1A01B18 – കമാസാഹിത്യം

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

CO1: ചെറുകഥ, നോവൽ പഠനത്തിലൂടെ വായനാശേഷിയും ആസ്വാദനപ്രാപ്തിയും കൈവരിക്കൽ.

CO2: ചെറുകഥയുടെയും നോവലിന്റെയും കാലാനുസൃതമായ ഭാവുകത്വപരിണാമം തിരിച്ചറിയൽ.

CO3: നിലവിലുള്ള സാമൂഹ്യജീവിത യാഥാർത്ഥ്യങ്ങളെ അഭിമുഖീകരിക്കാൻ പ്രാപ്തരാക്കൽ.

CO4: ആശയവിനിമയം, ഭാഷാവിഷ്കരണം എന്നീ ശേഷികൾ കൈവരിക്കുന്നു

CO5: കഥ, നോവൽ എന്നിവയുടെ വ്യതിരിക്ത സവിശേഷതകൾ തിരിച്ചറിയുന്നു.

CO6: പുതുകാലജീവിതാനുഭവങ്ങൾ വിലയിരുത്താൻ പര്യാപ്തരാകുന്നു

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	1	1	2	2
CO3	1	1	1	3	3
CO4	1	1	1	3	2
CO5	1	1	1	2	2
CO6	1	1	1	2	2

Syllabus Content:

ഖണ്ഡംഒന്ന്- (10 മണിക്കൂർ)

- 1.പുവമ്പഴം -കാരുർ
- 2.ഭൂമിയുടെഅവകാശികൾ -വൈക്കംമുഹമ്മദ്ബഷീർ

ഖണ്ഡംരണ്ട് - (15 മണിക്കൂർ)

- 1.കടൽ -ടി .പദ്മനാഭൻ
- 2.പെരുമഴയുടെപിറേന്ന് -എം. ടി. വാസുദേവൻനായർ
- 3.മാനാഞ്ചിറടെസ്സ് -വി .കെ.എൻ
- 4.തരിശുനിലം -മാധവിക്കുട്ടി

ഖണ്ഡംമൂന്ന് - (15 മണിക്കൂർ)

- 1.ആർക്കറിയാം -സക്കറിയ
- 2.ഓരോഎഴുത്തുകാരിയുടെഉള്ളിലും -സാരാജോസഫ്
- 3.തിരുത്ത് -എൻ .എസ് .മാധവൻ
- 4.മോഹമത്തെ -കെ .ആർ .മീര

ഖണ്ഡംനാല്- (10 മണിക്കൂർ)

- 1.അഗ്നി -സിതാര.എസ്
- 2.ബിരിയാണി -സന്തോഷ്എച്ചിക്കാനം
- 3.മോദസ്ഥിരനായി അങ്ങ് വസിപ്പൂമലപോലെ -എസ്. ഹരീഷ്
- 4.സ്നേഹബഹുമാനപ്പെട്ടഅന്നാമ്മയ്ക്ക്ഗീതാലക്ഷ്മിഎഴുതുന്നകത്ത് -(പ്രിയഎ) .എസ്
- 5.ചിലസ്വപ്നങ്ങളിൽസീതാലക്ഷ്മിയുടെകറുത്തമുടിയിഴ -ഇന്ദുമേനോൻ

ഖണ്ഡംഅഞ്ച് - (22 മണിക്കൂർ)

- ആടുജീവിതം -ബന്യാമിൻ

SEMESTER I

COMMON COURSE II

HN1A01B18- KAHAANI AUR UPANYAS

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

CO1: Discuss story content and structure in depth.

CO2: Analyse characterisation and comment on the development of the characters as the story/
novel unfolds.

CO3: Analyse short stories and novels on the basis of literary elements like plot, theme, metaphor,
and image.

CO4: Compare treatments of theme, character and subject matter of different short
stories.

CO5: Illustrate greater reading fluency and improved vocabulary in Hindi.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	1	1	2	2
CO3	1	1	1	2	2
CO4	1	1	1	2	2
CO5	1	1	1	3	2

Syllabus Content:

Module I:

(18 Hours)

ANTHIM SAAKSHYA –CHANDRAKAANTA CHAPTERS 1, 2

EIDGAAH- PREMCHAND

Module II:

(20 Hours)

ANTHIM SAAKSHYA –CHANDRAKAANTA CHAPTERS 3, 4, 5 JANGAL KA DAAH- SWAYAM
PRAKASH CHCHUTTI KA DIN- USHA PRIYAMVADA

Module III:

(20 Hours)

ANTHIM SAAKSHYA –CHANDRAKAANTA CHAPTERS 6,7,8 MAA RASOI MEI REHTI HAI –
KUMAR AMBUJ KHEER – MADHAVI KUTTY

Module IV:

(16 Hours)

ANTHIM SAAKSHYA –CHANDRAKAANTA CHAPTERS 9, 10 HEELIBON KI BATHTHAKHE-
AGYEY

SEMESTER I

COMMON COURSE II

FR1A01B18- FRENCH LANGUAGE AND COMMUNICATIVE SKILLS -I

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

CO1: Describe topics such as family, professions, time, place, likes and dislikes, daily life situations.

CO2: Develop language, vocabulary and grammar skills.

CO3: Articulate various speech sounds and their determined combinations.

CO4: Prepare conversations based on scenarios which helps while traveling

CO5: Articulate the concepts to express one's opinion in a specific situation.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	1	1	3	2
CO3	1	1	1	3	2
CO4	1	1	1	2	2
CO5	1	1	1	3	2

Syllabus Content:

Module I : (25 hours)

La population L'alphabet – Les chiffres – Identité – Se présenter – Poser des questions – Les professions – Les nationalités

Module II : (23 hours)

La banlieue Demander une information, un prix – l'heure – la ville

Module III : (24 hours)

Quartier de Paris Décrire un lieu – Indiquer un prix, un itinéraire.

SEMESTER I

COMPLEMENTARY COURSE I

MT1C01B18– DIFFERENTIAL AND INTEGRAL CALCULUS

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO1: Evaluate the rate of change of functions using the definition of limit and the differentiation rules

CO2: Apply the concept of differentiation to find the extreme values of a function and interpret the consequences of Rolle's Theorem and Mean value theorem for differentiable functions.

CO3: Interpret the area under the curve as a definite integral and find the area between curves.

CO4: Apply integration to calculate lengths of plane curves, areas of surfaces of revolution and volumes by slicing and rotation about an axis.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	1	1	2
CO2	1	3	1	1	2
CO3	1	3	2	1	2
CO4	1	3	1	1	2

Syllabus Content:

Module I :Differential Calculus:

(22 Hours)

Rates of change and limits, calculating limits using the limit laws, the precise definition of a limit, one sided limits and limits at infinity, derivative of a function, differentiation rules, the derivative

as a rate of change, derivatives of trigonometric functions, the chain rule and parametric equations, implicit differentiation.

Module II: Applications of Derivatives: (15 Hours)

Extreme values of functions, The Mean Value Theorem, Monotonic functions and the first derivative test.

Module III: Integral Calculus: (15 Hours)

A quick review of indefinite integral as anti-derivative, The Definite integral, The fundamental theorem of Calculus

Module IV: Application of Integrals: (20 Hours)

Substitution and area between curves, Volumes by slicing and rotation about an axis (disc method only), Lengths of plane curves, Areas of surfaces of revolution and the theorem of Pappus (excluding theorem of Pappus).

SEMESTER I

COMPLEMENTARY COURSE I

PH1C02B18: PROPERTIES OF MATTER & THERMODYNAMICS

Credits: 2

Total Lecture Hours: 36

Course Outcomes:

CO1: Apply static and dynamic methods to determine rigidity modulus and bending of beams to Young's modulus

CO2: Discuss the theory for the dynamics of fluid systems

CO3: Examine Carnot engine and refrigerator by applying second law of thermodynamics

CO4: Deduce Maxwell's thermodynamic relations from thermodynamic potentials

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	1	2
CO2	1	3	2	1	2
CO3	2	3	2	1	2
CO4	2	3	1	1	2

Syllabus Content:

Module I: Elasticity

(13 hours)

Stress- strain- Hooke's law- Elastic moduli- Poisson's ratio- twisting couple determination of rigidity modulus- static and dynamic methods- static torsion- torsion pendulum, bending of beams- cantilever, uniform and non-uniform bending, I section girder.

Text Book :Mechanics - D. S. Mathur- Revised by P. S. Hemne, S. Chand & Co., Chapters 13 & 14.

Module II: Surface tension

(3 hours)

Molecular theory of surface tension - surface energy - excess pressure in a liquid drop, factors affecting surface tension – applications

Text book:Mechanics– Prof. D.S Mathur Revised by: Dr. P.S Hemne. , S Chand & Company Pvt. Ltd, chapter 15

Hydrodynamics

(7 hours)

Streamline and turbulent flow - critical velocity - Coefficient of viscosity - Derivation of Poiseuille's equation, Stokes equation-Determination of viscosity by Poiseuille's method- Brownian motion – Viscosity of gases – Bernoulli's theorem.

Text book: Properties of Matter- Brijlal and N. Subrahmaniam, S. Chand &Company Pvt. Ltd,1989, Chapter 8

Module III: Thermodynamics

(13 hours)

Thermodynamic systems- thermodynamic equilibrium- thermodynamic processes isothermal process- adiabatic process- zeroth law of thermodynamics, first law of thermodynamics- heat engine- the Carnot engine- refrigerator, concept of entropy second law of thermodynamics- third law of thermodynamics- Maxwell's thermodynamic relations.

Text Book : Heat and Thermodynamics, Brijlal and Subrahmanyam and P. S. Hemne, S. Chand & Co., Chapter 5 & 6

SEMESTER I

CORE COURSE

CH1B01B18: GENERAL AND ANALYTICAL CHEMISTRY

Credits: 2

Total Lecture Hours: 36

Course Outcomes:

CO1: Estimate the number of significant digits, mean and standard deviation, percentage and distribution of errors from a set of analytical data and the molecular mass, molarity, oxidation and reduction numbers, equivalent mass.

CO2: Explain the methodology of chemistry and the periodic properties of elements

CO3: Illustrate the principles of analytical chemistry in the intergroup separation of cations, quantification of analytes by titrimetry, gravimetry and separation of organic compounds

CO4: Differentiate between column chromatography, TLC, GC, Ion exchange chromatography and HPLC

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	1	2
CO2	3	2	2	1	1
CO3	3	2	3	1	2
CO4	3	2	2	1	1

Syllabus Content:

Module 1: Methodology of Chemistry and Evaluation of Analytical Data (12Hours)

Definition of Science. Scientific methods - observation-posing a question - formulation of hypothesis- experiment – theory - law. Falsification of hypothesis - inductive and deductive reasoning- revision of scientific theories and laws.

Evolution of Chemistry-ancient speculation on the nature of matter. Early form of chemistry- alchemy, origin of modern chemistry. Structure of chemical science: Scope, theory and experiment - branches of chemistry. Role of chemistry as a central science connecting physics, biology and other branches of science. Interdisciplinary areas involving chemistry: Nanotechnology and biotechnology.

Evaluation of Analytical Data: Units, significant digits, rounding, scientific and prefix notation, graphing of data. Precision and accuracy-types of errors – ways of expressing precision – ways to reduce systematic errors - reporting analytical data. Statistical treatment of analytical data – population and samples –Mean and standard deviation – distribution of random errors.

Module II: Periodic Table and Properties (6 Hours)

Modern periodic law – Long form periodic table. Diagonal relationship and anomalous behavior of first element in a group. Periodicity in properties: Atomic and ionic radii - ionization enthalpy - electron affinity (electron gain enthalpy) – electronegativity. Electronegativity scales: Pauling and Mullikan scales. Effective nuclear charge – Slater rule and its applications – polarising power.

Molecular mass - mole concept – molar volume. Oxidation and reduction – oxidation number and valency – variable valency - equivalent mass of oxidizing agent and reducing agent using oxidation number concept.

Module III : Analytical Methods in Chemistry (18 Hours)

Qualitative analysis: Applications of solubility product and common ion effect in the precipitation of cations. Principle of intergroup separation of cations. Interfering acid radicals and their elimination (oxalate, fluoride, borate and phosphate).

Titrimetric analysis - fundamental concepts. Methods of expressing concentration: Weight percentage, molality, molarity, normality, mole fraction, ppm. and ppb. Primary and secondary standards, quantitative dilution – problems. Acid base titrations- titration curves – pH indicators. Redox titrations – titration curve –titrations involving MnO_4^- and $\text{Cr}_2\text{O}_7^{2-}$ - redox indicators. Complexometric titrations – EDTA titrations - titration curves – metal ion indicators. Gravimetric analysis: Unit operations in gravimetric analysis - illustrations using iron and barium estimation. Separation and purification techniques – filtration, crystallization and precipitation – fractional distillation, solvent extraction.

Chromatographic Methods: Column Chromatography: Principle, types of adsorbents, preparation of the column, elution, recovery of substances and applications. Thin Layer Chromatography: Principle, choice of adsorbent and solvent, preparation of Chromatoplates, R_f -values, significance of R_f values. Ion exchange chromatography: Principle and experimental techniques. Gas Chromatography: Principle and experimental techniques. High Performance Liquid Chromatography (HPLC): Principle and experimental techniques.