
ST. TERESA'S COLLEGE, ERNAKULAM
(AUTONOMOUS)

Affiliated to Mahatma Gandhi University, Kottayam



CURRICULUM FOR
BACHELOR'S PROGRAMME
IN PHYSICS

Under Choice Based Credit & Semester System
& Outcome Based Education

(2018 Admissions)

BPHY - B.Sc. PHYSICS

PROGRAM SPECIFIC OUTCOMES

PSO1: Explain the major concepts and theoretical principles in Physics

PSO2: Solve problems using basic understandings in Physics and mathematical and statistical tools

PSO3: Integrate critical thinking and scientific knowledge to design, perform, record and analyse experiments

PSO4: Develop communication skills to decipher and transmit the basic concepts and emerging trends in Physics and foster social responsibility and environmental consciousness

PSO5: Apply the theoretical knowledge and skills to identify, investigate and formulate new ideas and concepts

SEMESTER I

Course Code	Course Title	Credits	Course Type
EN1A01B18	Fine-Tune Your English	4	Common Course I
EN1A02B18	Pearls From The Deep	3	Common Course I
FR1A01B18	French Language And Communicative Skills -I	4	Common Course II
HN1A01B18	Kahaani Aur Upanyas	4	
MA1A01B18	Kathasahithyam	4	
MT1C01B18	Differential And Integral Calculus	3	Complementary Course I
ST1C01B18	Descriptive Statistics	3	Complementary Course II
PH1B01B18	Methodology And Perspectives Of Science	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	2	1	1	2	1
CO2	2	1	2	3	1
CO3	2	1	1	2	1
CO4	2	1	2	3	2
CO5	1	1	2	3	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 – Passivation

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	2	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1

Syllabus Content

Module I (Fiction) (18hours)

Ernest Hemingway: The Old Man and the Sea

Module II (One Act Plays) (18hours)

Susan Glaspell: Trifles

Asif Currimbhoy: The Refugee

A.A Milne: The Boy Comes Home

Module III (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 IV (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

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	1
CO2	1	1	1	3	2
CO3	1	1	1	3	1
CO4	1	1	1	3	1
CO5	1	1	1	3	2

Syllabus Content:

Module I

(25 hours)

La population L'alphabét – 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.

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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.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I:(16 Hrs)

Syllabus- Anthim Saakshya –Chandrakaanta Chapters 1 ,2

Eidgaah- Premchand

Module II (20 hrs)

Syllabus-Anthim Saakshya –Chandrakaanta Chapters 3, 4, 5 Jangal Ka Daah- Swayam Prakash
Chchutti Ka Din- Usha Priyamvada

Module- III (20hrs)

Syllabus- Anthim Saakshya –Chandrakaanta Chapters 6,7,8 Maa Rasoi Mei Rehti Hai – Kumar
Ambuj Kheer – Madhavi Kutty

Module IV:(16 Hrs)

Syllabus- Anthim Saakshya –Chandrakaanta Chapters 9, 10 Heelibon Ki Baththakhe- Agyey

SEMESTER I
COMMON COURSE II
MA1A01B18 - KATHASAHITHYAM

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

- CO1:** ചെറുകഥ, നോവൽ പഠനത്തിലൂടെ വായനാശേഷിയും ആസ്വാദനപ്രാപ്തിയും കൈവരിക്കൽ.
- CO2:** ചെറുകഥയുടെയും നോവലിന്റെയും കാലാനുസൃതമായ ഭാവുകത്വ പരിണാമം തിരിച്ചറിയൽ.
- CO3:** നിലവിലുള്ള സാമൂഹ്യജീവിത യാഥാർത്ഥ്യങ്ങളെ അഭിമുഖീകരിക്കാൻ പ്രാപ്തമാക്കൽ.
- CO4:** ആശയവിനിമയം, ഭാഷാവിഷ്കരണം എന്നീ ശേഷികൾ കൈവരിക്കുന്നു
- CO5:** കഥ, നോവൽ എന്നിവയുടെ വ്യതിരിക്ത സവിശേഷതകൾ തിരിച്ചറിയുന്നു.
- CO6:** പുതുകാലജീവിതാനുഭവങ്ങൾ വിലയിരുത്താൻ പര്യാപ്തമാകുന്നു

Mapping of Course Outcomes with Program Specific Outcomes

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

ഖണ്ഡം ഒന്ന്	10 മണിക്കൂർ
1.പുവമ്പഴം -കാരുർ 2.ഭൂമിയുടെ അവകാശികൾ -വൈക്കം മുഹമ്മദ്ബഷീർ	
ഖണ്ഡം രണ്ട്	15മണിക്കൂർ
1.കടൽ -ടി .പദ്മനാഭൻ 2.പെരുമഴയുടെ പിറ്റേന്ന് -എം. ടി. വാസുദേവൻ നായർ 3.മാനാഞ്ചിറടെസ്സ് -വി .കെ.എൻ 4.തരിശു നിലം -മാധവിക്കുട്ടി	
ഖണ്ഡം മൂന്ന്	15മണിക്കൂർ
1.ആർക്കറിയാം -സക്കറിയ 2.ഓരോഏഴുത്തുകാരിയുടെഉള്ളിലും -സാനാജോസഫ് 3.തിരുത്ത് -എൻ .എസ് .മാധവൻ 4.മോഹമത്തെ -കെ .ആർ .മീര	
ഖണ്ഡം നാല്	10 മണിക്കൂർ
1.അഗ്നി -സിതാര.എസ് 2.ബിരിയാണി -സന്തോഷ് എച്ചിക്കാനം 3.മോദസ്ഥിരനായി അങ്ങാടിപ്പുമല പോലെ -എസ്. ഹരീഷ് 4.സ്നേഹബഹുമാനപ്പെട്ട അന്നാമ്മയ്ക്ക്സീതാലക്ഷ്മി എഴുതുന്ന കത്ത് -(പിയ എ .എസ് 5.ചിലസ്വപ്നങ്ങളിൽസീതാലക്ഷ്മിയുടെ കറുത്ത മുടിയിഴ -ഇന്ദുമേനോൻ	
ഖണ്ഡം അഞ്ച്	22മണിക്കൂർ
ആടുജീവിതം -ബന്യാമിൻ	

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	2	3	2	1	1
CO2	2	3	1	1	1
CO3	2	3	2	1	2
CO4	2	3	1	1	2

Syllabus Content

Module 1

Differential Calculus: (22 Hrs)

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 Hrs)

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

Module III

Integral Calculus: (15 Hrs)

A quick review of indefinite integral as antiderivative, The Definite integral, The fundamental theorem of Calculus

Module IV

Application of Integrals: (20Hrs)

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 II

ST1C01B18 -- DESCRIPTIVE STATISTICS

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO1: Describe the basic concepts of Statistics.

CO2: Manage raw data by constructing tables and expressing them by diagrams and graphs.

CO3: Illustrate the fundamental characteristics of data

CO4: Evaluate the different types of Index numbers

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I

(20 hours)

Introduction to Statistics, Population and Sample, Collection of Data, Various methods of data collection, Census and Sampling. Methods of Sampling – Simple Random Sampling– stratified sampling – systematic sampling (Method only), Types of data – quantitative, qualitative, Classification and Tabulation, Frequency Table, Diagrammatic representation – Bar diagram, pie diagram; pictogram and cartogram.

Module II

(20 hours)

Measures of Central Tendency – Mean; Median; Mode; Geometric Mean; Harmonic Mean and Properties, Partition values- Quartiles, Deciles, Percentiles, Absolute and Relative measures of Dispersion – Range, Quartile Deviation, Box Plot, Mean Deviation, Standard Deviation, Coefficient of Variation. Graphical representation – histogram, frequency polygon, frequency curve, ogives and stem and leaf chart.

Module III

(16 hours)

Raw Moments, Central Moments, Inter Relationships (First Four Moments), Skewness – Measures – Pearson's, Bowley's and Moment Measure; Kurtosis- Measures of Kurtosis – Moment Measure, Measure based on partition values.

Module IV

(16 hours)

Index Numbers – definition, limitations, uses, Simple Index Numbers; Weighted Index Numbers – Laspeyer's, Paasche's and Fisher's Index Numbers, Test of Index Numbers, Construction of Index Numbers, Cost of Living Index Numbers – Family Budget Method, Aggregate Expenditure Method.

SEMESTER I
CORE COURSE

PH1B01B18- METHODOLOGY AND PERSPECTIVES OF PHYSICS

Credits: 2

Total Lecture Hours: 36

Course outcome

CO1: Review the emergence of new scientific concepts with reference to the contributions of various scientists

CO2: Solve number conversion problems and binary arithmetics

CO3: Compute line, surface and volume integrals of vectors

CO4: Estimate and report the errors occurring in a mathematical calculation

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I

Concepts and Development of Physics (8hrs)

Development of physics and the birth of new scientific concepts with reference to scientific contributions of Galileo – perspectives on universe, Newton- deterministic universe, Einstein- theory of relativity, J J Thomson – atom model, Marie Curie- radioactivity, Max Plank- quantum hypothesis, deBroglie- matter wave, Heisenberg- uncertainty principle and Schrodinger- quantum mechanics. Contributions of Indian physicists -C V Raman, H J Babha, J C Bose, S N Bose, M N Saha, S Chandrasekhar (Topics in this part require qualitative study only).

Module II

Number systems (18 hrs)

Decimal, hexadecimal and Binary Numbers. Conversions, Binary arithmetic addition, subtraction and multiplication. 1's and 2's complement subtraction –signed binary numbers. Signed binary arithmetic, BCD code, ASCII code, Significance of binary number system in digital electronics, microprocessors and in computers.

Introductory Vector Analysis - Applications of vectors in Physics. Differential and integral vector calculus: – The operator - physical significance of Gradient, Divergence and Curl, Line integral, surface integral and volume integral of vectors.

Coordinate systems: Cartesian Co-ordinate system, plane polar and spherical polar coordinates, cylindrical coordinates (Basic ideas with examples in physics).

Module III

Experimental methods and error analysis (10 hrs)

Experimental methods, least count of instruments, Instruments for measuring mass, length, time, angle , current, voltage. Fundamental units. Precision and accuracy of measurements, source of error in measurements, necessity of estimating errors, types of errors, reading error of

instrument, calibration error, random error, systematic error, significant digits, order of magnitude and rounding of numbers, rounding error, absolute and relative errors, Errors of computation- addition, subtraction, multiplication, division, error in power and roots, Propagation of errors, analysis of data, standard deviation, calculation of mean value.