ST. TERESA'S COLLEGE, ERNAKULAM

(AUTONOMOUS)

Affiliated to Mahatma Gandhi University, Kottayam

CURRICULUM FOR

BACHELOR'S PROGRAMME

IN

MATHEMATICS

Under Choice Based Credit & Semester System
& Outcome Based Education

(2018 Admissions)

BMAT- BACHELOR'S PROGRAMME IN MATHEMATICS

PROGRAM SPECIFIC OUTCOMES

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PSO1: Explain underlying structures of mathematics (i.e., logical structure, sets, relations and functions) and the relationships among them.

PSO2: Construct basic manipulative skills in Number theory, Graph theory, Calculus, Analysis, Algebra and Geometry.

PSO3: Develop expertise in constructing mathematical proofs and employ mathematical ideas to design models for solving real world problems in pace with technological advancements.

PSO4: Integrate logical reasoning, critical thinking, intellectual curiosity and scientific temper to extrapolate the acquired knowledge into different branches of science.

PSO5: Develop analytical, creative and cognitive skills and foster social responsibility along with 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	
FR1A01B18	French Language and Communicative Skills-I	4	Common Course II
HN1A01B18	Kahaani Aur Upanyas		
MA1A01B18	Kathasahithyam		
ST1C01B18	Descriptive Statistics	3	Complementary course I
PH1C01B18	Properties of matter & error analysis	2	Complementary course II
MT1B01B18	Discrete Mathematics and Trigonometry	3	Core course-1

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

Syllabus Content

Module 1 **(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 Pronounciation : 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	2	3	3
CO3	1	1	1	1	2
CO4	1	1	1	2	2

Syllabus Content

Module 1 **(18hours)**

Fiction : Ernest Hemingway: The Old Man and the Sea

Module II **(18hours)**

One Act Plays : Susan Glaspell: Trifles, Asif Currimbhoy: The Refugee, A.A Milne: The Boy Comes Home

Module III **(18hours)**

Short Stories : 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 **(18hours)**

Poems : 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–KATHASAHITHYAM

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

CO1: ചെറുകഥ,നോവൽ പഠനത്തിലൂടെ വായനാശേഷിയും ആസ്വാദന പ്രാപ്തിയും കൈവരിക്കൽ.

CO2: ചെറുകഥയുടെയും നോവലിന്റെയും കാലാനുസൃതമായ ഭാവുകത്വപരിണാമം തിരിച്ചറിയൽ.

CO3: നിലവിലുള്ള സാമൂഹ്യജീവിതയാഥാർഥ്യങ്ങളെ 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	2	2	2	3	3
CO2	1	1	1	2	1
CO3	1	1	3	2	2
CO4	3	2	3	2	3
CO5	1	2	1	2	2
CO6	2	1	3	2	2

Syllabus content

ഖണ്ഡംഒന്ന് **(10 മണിക്കൂർ)**

1.പൂവമ്പഴം -കാരൂർ

2.ഭൂമിയുടെഅവകാശികൾ -വൈക്കംമുഹമ്മദ്ബഷീർ

ഖണ്ഡംരണ്ട് **(15മണിക്കൂർ)**

1.കടൽ -ടി .പദ്മനാഭൻ

2.പെരുമഴയുടെപിറ്റേന്ന് -എം. ടി. വാസുദേവൻനായർ

3.മാനാഞ്ചിറടെസ്റ്റ് -വി .കെ.എൻ

4.തരിശുനിലം -മാധവിക്കുട്ടി

ഖണ്ഡംമൂന്ന് **(15മണിക്കൂർ)**

1.ആർക്കറിയാം -സക്കറിയ

2.ഓരോഎഴുത്തുകാരിയുടെഉള്ളിലും -സാറാജോസഫ്

3.തിരുത്ത് -എൻ .എസ് .മാധവൻ

4.മോഹമഞ്ഞ -കെ .ആർ .മീര

ഖണ്ഡംനാല് (10 മണിക്കൂർ)

1.അഗ്നി -സിതാര.എസ്

2.ബിരിയാണി -സന്തോഷ്എച്ചിക്കാനം

3.മോദസ്ഥിരനായിഅങ്ങവസിപ്പൂമലപോലെ -എസ്. ഹരീഷ്

4.സ്നേഹബഹുമാനപെട്ടഅന്നാമ്മയ്ക്ക്ഗീതാലക്ഷ്മിഎഴുതുന്നകത്ത് -പ്രിയഎ .എസ്

5.ചിലസ്വപ്നങ്ങളിൽ .....സീതാലക്ഷ്മിയുടെകറുത്തമുടിയിഴ -ഇന്ദുമേനോൻ

ഖണ്ഡംഅഞ്ച് (22മണിക്കൂർ)

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 characterization 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	2	1	2	1	2
CO3	1	2	1	2	1
CO4	2	2	2	2	2
CO5	1	1	2	2	3

Syllabus content

Module I **(16 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	1	2
CO2	1	1	1	1	3
CO3	1	1	1	1	2
CO4	1	1	2	2	2
CO5	1	1	1	1	3

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

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

COMPLEMENTARY COURSE II

PH1C01B18 – PROPERTIES OF MATTER & ERROR ANALYSIS

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: Analyze the factors affecting surface tension and viscosity

CO3: Discuss the theory for the dynamics of fluid systems

CO4: Estimate the errors occurring in a mathematical calculation

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I **(13 hours)**

Elasticity : 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.

Module II **(10 hours)**

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

Module III **(13 hours)**

Error Analysis - Basic ideas – uncertainties of measurement – importance of estimating errors – dominant errors – random errors – systematic errors - rejection of spurious measurements. Estimating and reporting errors – errors with reading scales, errors of digital instruments – number of significant digits –absolute and relative errors – standard deviation. Propagation of errors – sum and differences – products and quotients – multiplying by constants – powers.

SEMESTER I

CORE COURSE-1

MT1B01B18 – DISCRETE MATHEMATICS AND TRIGONOMETRY

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO1: Explain the Propositional Calculus in Mathematical Logic and apply various methods for proving theorems.

CO2: Discuss Set theory , Relations, Functions, Ordered sets & Lattices.

CO3: Analyze circular and hyperbolic functions

CO4: Compute the factors of expressions like $x^n - 1$, $x^n + 1$ and $x^{2n} - 2x^n a^n \cos n\theta + a^{2n}$

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module 1 **(20 Hrs)**

Mathematical Logic: Propositional logic, Propositional equivalences, Predicates and quantifiers, Rules of inference,Introduction to proofs

Module 2 **(12Hrs)**

Set theory: Sets, set operations, functions

Module 3 **(20 Hrs)**

Ordered sets & Lattices: Poset, Product set & order, Hasse diagrams of partially ordered sets,Minimal& Maximal, and First & Last point, Lattices, Lattices as partially ordered sets.

Module 4 **(20hrs)**

Trigonometry : Circular and hyperbolic functions of a complex variable Separation into real and imaginary parts. Factorisation of x^n-1, x^n+1, $x^{2n} - 2x^n a^n \cos n\, t + a^{2n}$. Summation of infinite series by C+iS method.

SEMESTER II

Course Code	Course Title	Credits	Course Type
EN2A03B18	Issues That Matter	4	Common course I
EN2A04B18	Savouring The Classics	3	Common course I
MA2A03B18	Kavitha	4	Common course II
HN2A03B18	Kavita Vyakaran Aur Anuvad		Common course II
FR2A03B18	French Language And Communicative Skills-Ii		Common Course II
ST2C01B18	Probability And Random Variables	3	Complementary course I
PH2C01B18	Mechanics And Astrophysics	2	Complementary course II
PH2CP01B18	Practical	2	Complementary II Practical
MT2B02B18	Number Theory, Cryptography, Laplace Transforms & Conic Sections	3	Core course-2

SEMESTER II

COMMON COURSE I

EN2A03B18 - ISSUES THAT MATTER

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1 : Identify the major issues of contemporary significance

CO2 : Discuss the consequences of war and refugee crisis with respect to the psychological dimension

CO3 : Employ theoretical learning in classrooms to current developments in the world.

CO4 : Critique the diverse experiences both historical and contemporary to create a more informed vision of the future .

CO5 : Develop oneself as a conscious, concerned, conscientious human being.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module 1 **(18 hours)**

"The Unsurrendered People" – Kenzaburo Oe

"The Old Prison" – Judith Wright

"War" – Luigi Pirandello

Module 2 **(18 hours)**

Persuasions on the Power of the Word:"On Censorship" – Salman Rushdie "Peril" – Toni Morrison

"The Burning of the Books" – Bertolt Brecht

"The Censors" – Luisa Valenzuela

Module 3 **(18 hours)**

"The Poisoned Bread" – BandhuMadhav

"A Trip Westward" – Zitkala-Sa

"The Pot Maker" – TemsulaAo

Module 4 **(18 hours)**

"Does it Matter?" – Richard Leakey

"On Killing a Tree" – Gieve Patel

"Hagar: A Story of a Woman and Water" (Gift in Green (chapter 2)) – Sarah Joseph

Module 5 **(18 hours)**

"Understanding Refugeeism: An Introduction to Tibetan Refugees in India" – Mallica Mishra

"Refugee Blues" – W.H Auden

"The Child Goes to the Camp" (from Palestine's Children) – GhassanKanafani

SEMESTER II

COMMON COURSE I

EN2A04B18 – SAVOURING THE CLASSICS

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO1: Recognize the time-tested literary masterpieces from diverse cultures.

CO2: Identify the representative authors from various genres (poetry, drama, novel, short fiction) .

CO3: Recite celebrated lines from Classic works.

CO4: Discuss the 'universals' of human condition .

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	1	2
CO4	1	1	2	2	2

Syllabus Content :

Module 1 (Poems) (18hours)

Homer: "Father and Son" (Odyssey Book 16: 113-189) (Translated by Robert Fagles)

Kalidasa: "Lovely is Youth" (Translated by J.G Jennings)

Omar Khayyam: Rubaiyat (quatrains: 25-28) (Translated by Edward Fitzgerald)

Dante: Dante meets Virgil (Inferno Canto 1: 49-102) (Translated by J.G Nichols)

John Milton: "On his Blindness"

Module 2 (Shakespeare Excerpts) (18hours)

Romeo and Juliet: Act II, Scene ii

The Merchant of Venice: Act IV, Scene i

Module 3 (Novel Excerpts) (18hours)

Miguel de Cervantes: Don Quixote (Chapter 8) (Translated by Edith Grossman)

Jane Austen: Pride and Prejudice (Chapters 1-6)

Victor Hugo: Les Miserables (Part 1- Fantine, Book II, Chapters 9-13) (Translated by Christine Donougher)

Module 4 (Short Fiction) (18hours)

Charles Dickens: The Black Veil

Leo Tolstoy: How Much Land Does a Man Need? (Translated by Louise &Aulmer Maude)

Rabindranath Tagore: Kabuliwala (Translated by Mohammad AQuayum)

Jorge Louis Borges: The Shape of the Sword (Translated by Andrew Hurley)

SEMESTER II

COMMON COURSE II

FR2A03B18- FRENCH LANGUAGEAND COMMUNICATIVE SKILLS -II

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

CO1 : Identify familiar everyday expressions and basic phrases.

CO2 : Ask questions to get meaningful responses in effective communication.

CO3 : Develop language, vocabulary and grammar skills.

CO4 : Prepare conversations based on various situations.

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

Syllabus Content:

Module I **(25 hours)**

Chambre pour étudiants Localiser des objets – l'habitat – les meubles – l'appréciation

Module II **(23 hours)**

PetitsboulotsTéléphoner – Raconter – l'emploi

Module III **(24 hours)**

Le resto U Exprimerune opinion – Poser des questions – la nourriture

SEMESTER II

COMMON COURSE II

HN2AO3B18 - KAVITA, VYAKARAN AUR ANUVAD

Credits – 4

Total Hours- 72

Course Outcomes:

CO1: Contextualize and summarise the poems of different genres in Hindi .

CO2: Evaluate the Poets contribution to Hindi literature.

CO3: Demonstrate linguistic ability for translation of texts between Hindi & English.

CO4: Classify Parts of Speech.

CO5: Illustrate greater fluency in Hindi by applying theoretical knowledge of Grammar.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I **(18 Hours)**

Vyaakaran

Module II **(20 Hours)**

Tulasidas

Kabir

VeMuskathePhoolNahi- MahadeviVerma

CheenaneAaye Hain Ve – SarweshvarDayalSaxena

DilliDarwaaza – Kumar Vimal

Jungle KeUjaad Mei – Vinod Kumar Shukla

Aazadi Urf Gulaami – Gyanendrapathi

Module III **(20 Hours)**

Meera

Bazaar- MangaleshDabraal

BeesviSadiKeAntim Dino KaAashcharya- Rajesh Joshi

Do Haathiyon Ki Ladaai- UdaPakash

ThandePaani Ki Machine – EkantSrivastav

Saboot – Arun Kamal

TumheKuchKarnaChahiye – ChanrakanthDevthale

Module IV **(14 Hours)**

Anuvaad

സെമസ്റ്റർ രണ്ട്

കോമൺകോഴ്സ് II- മലയാളം

MA2A03B18-കവിത

ക്രെഡിറ്റ് : 4

പഠനസമയം : 72 മണിക്കൂർ

കോഴ്സ്ഔട്ട്കം (Course Outcome)

CO1:പത്തൊൻപത്കവിതകളുടെ പഠനത്തിലൂടെ വായനാശേഷിയും ആസ്വാദനപ്രാപ്തിയും കൈവരിക്കൽ.

CO2:മലയാളകവിതകളിലെ കാലാനുസൃതമായ ഭാവുകത്വപരിണാമം തിരിച്ചറിയൽ.

CO3:നിലവിലുള്ള സാമൂഹ്യ ജീവിത യാഥാർഥ്യങ്ങളെ അഭിമുഖീകരിക്കാൻ പ്രാപ്തരാക്കൽ.

CO4:പരിസ്ഥിക സൗന്ദര്യശാസ്ത്രത്തെയും ചില സാമൂഹ്യ ചരിത്ര പശ്ചാത്തലങ്ങളെയും കുറിച്ച്ഗ്രഹിക്കൽ.

CO5:വിദ്യാർത്ഥികളുടെ സർഗ്ഗാത്മക ശേഷി വികസിക്കൽ.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus content :

ഖണ്ഡംഒന്ന്- **20 മണിക്കൂർ**

1. മാംസനിബദ്ധമല്ലരാഗം -കുമാരനാശാൻ(ലീലയിലെ 47 മുതൽ 74 വരെയുള്ള 28 ശ്ലോകങ്ങൾ)

2.സ്നേഹസുന്ദരപാതയിലൂടെ -വൈലോപ്പിള്ളി
('കുടിയൊഴിക്കലി'ലെഅവസാനഖണ്ഡം)

ഖണ്ഡംരണ്ട് **15 മണിക്കൂർ**

1 .ഒറ്റയ്ക്കിരിക്കാൻപഠിച്ചുകഴിഞ്ഞുഞാൻ -സുഗതകുമാരി

2 .കോഴി -കടമ്മനിട്ടരാമകൃഷ്ണപിള്ള

3 .പഴഞ്ചൊല്ലുകൾ -സച്ചിദാനന്ദൻ

4 .മുള്ളൻപന്നി -കെ.ജി.ശങ്കരപ്പിള്ള

ഖണ്ഡംമൂന്ന് **15 മണിക്കൂർ**

1.തിരുത്ത്-പി .പി.രാമചന്ദ്രൻ

2.പിറക്കാത്തമകന് -ബാലചന്ദ്രൻചുള്ളിക്കാട്

3.മൃഗശിക്ഷകൻ -വിജയലക്ഷ്മി

4.കുന്നിമണികൾ-കുഞ്ഞുണ്ണി

ഖണ്ഡംനാല് **22 മണിക്കൂർ**

1 .ആടിയാടിലഅലഞ്ഞമരങ്ങളേ -അൻവർഅലി

2 .കൽവീട് -വി.എം.ഗിരിജ

3 .ആഴങ്ങൾഅടച്ചിട്ടപുഴ -എസ് .ജോസഫ്

4 .സ്മാരകം -വീരാൻകുട്ടി

5 .കുട്ടമ്മാൻ -എം.ർ.രേണുകുമാർ

6 .നാഷണൽജ്യോഗ്രഫി -എസ് .കണ്ണൻ

7 .വാഴക്കുല -കെ .ആർ.ടോണി

8 .പഴയചിലത് -പി.രാമൻ

9 .ഗോതമ്പുശില്പം -കവിതബാലകൃഷ്ണൻ

SEMESTER II

COMPLEMENTARY COURSE I

ST2C01B18 – PROBABILITY AND RANDOM VARIABLES

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO 1: Analyze the degree of correlation between the variables using the concept of correlation .

CO 2: Articulate the concept of the principle of least squares to estimate the unknown parameters in regression model.

CO 3: Implement the concept of probability and Baye's theorem to understand the uncertainty in a given problem

CO 4: Illustrate the use of probability density function (pdf) of discrete and continuous random variables.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I **(16 hours)**

Introduction to bivariate data. Correlation-Different types of Correlation. Concepts of Simple, Multiple and Partial Correlations. Simple Linear Correlation – Methods of finding simple linear Correlation – Scatter Diagram, Covariance Method, Rank Correlation (equal ranks).

Module II **(16 hours)**

Curve Fitting – Method of Least squares- Fitting of Straight Lines, Second Degree Equation, Exponential Curve, Power Curve. Simple Linear Regression – Regression Equations – Fitting and identification, properties.

Module III **(20 hours)**

Probability Concepts – Random Experiment, Sample Space, Events, Probability Measure, Approaches to Probability – Classical, Statistical and Axiomatic, Addition Theorem (upto 3 evens) Conditional Probability, Independence of events, Multiplication theorem (upto 3 events), Total Probability Law, Baye's Theorem and its applications.

Module IV **(20 hours)**

Random Variables – Discrete and Continuous, Probability Distributions – Probability Mass Function; Probability Density Function and Cumulative (distribution) function and their properties, change of variables (Univariate only), Bivariate random variables – Definition – Discrete and Continuous, Joint Probability Density Functions, Marginal and Conditional Distributions, Independence of Random Variables.

SEMESTER II

COMPLEMENTARY COURSE II

PH2C01B18– MECHANICS AND ASTROPHYSICS

Credits: 2

Total lecture hours - 36 hrs

Course Outcomes:

CO1: Articulate the motion under gravity and determine the acceleration due to gravity.

CO2: Apply relevant theorems and strategies to determine the physical parameters related to rotational motion of bodies.

CO3: Represent and solve equations of oscillatory motion of particles.

CO4: Discuss the evolution of different kinds of stars.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I

Motion under Gravity (5 hours)

Velocity- acceleration- force – acceleration due to gravity - compound pendulum (symmetric and asymmetric) radius of gyration – Kater's Pendulum- centripetal acceleration and force - centrifugal force

Rotational Dynamics (10 hours)

Angular velocity- angular momentum- torque- conservation of angular momentum, angular acceleration- moment of inertia- parallel and perpendicular axes theorems moment of inertia of rod, ring, disc, cylinder and sphere- flywheel

Module II

Oscillations (9 hours)

Periodic and oscillatory motion- simple harmonic motion- differential equation, expression for displacement, velocity and acceleration- graphical representation- energy of a particle executing simple harmonic motion - damped oscillation- forced oscillation and resonance.

Waves (4 hours)

Waves-classifications- progressive wave- energy of progressive wave- superposition of waves-theory of beats- Doppler Effect.

Module III

Astrophysics (8 hours)

Temperature and color of a star- elements present in a stellar atmosphere- mass of star life time of a star- main sequence stars-HR diagram- evolution of stars- white dwarf -supernova explosion- neutron star- black hole- (all topics to be treated qualitatively)

SEMESTER II

COMPLEMENTARY II -PRACTICAL

PH2CP01B18– PHYSICS PRACTICAL

Credits: 2

Total Lecture Hours: 72

Course Outcomes:

CO1: Apply the knowledge of basic concepts in Physics to identify and select appropriate measuring instruments.

CO2: Analyze basics experiments in Properties of Matter, Mechanics and construct diode circuits.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	1	1	2	2	2
CO2	2	1	2	2	2

Syllabus Content

1. Vernier Calipers - Volume of a cylinder- sphere and a beaker
2. Screw gauge - Volume of a sphere and a glass plate
3. Beam balance - Mass of a solid (sensibility method)
4. Radius of a capillary tube- Using (1) travelling microscope
5. Density of a liquid - U-Tube and Hare's apparatus
6. Viscosity of a liquid - Variable pressure head
7. Surface Tension – Capillary rise method.
8. Cantilever - Pin & Microscope – Determination of Young's Modulus
9. Symmetric Compound Pendulum-Determination of radius of gyration(K) and Acceleration due to gravity (g)
10. Spectrometer – Angle of the Prism.
11. Cantilever – Scale and Telescope-Determination of Young's modulus
12. Asymmetric Compound Pendulum-Determination of K and g
13. Coefficient of Viscosity – Constant pressure head
14. Spectrometer - Refractive Index of material of prism.
15. Liquid lens - Refractive Index of glass using liquid of known refractive index
16. Potentiometer-Calibration of low range voltmeter
17. Characteristics of Zener diode
18. Construction of half wave rectifier with and without filter – Ripple factor and Load regulation
19. Characteristics of p-n junction diode
20. Torsion pendulum - Rigidity modulus

SEMESTER II

CORE COURSE - 2

MT2B02B18--NUMBER THEORY, CRYPTOGRAPHY, LAPLACE TRANFORMS &CONIC SECTIONS

Credits: 3

Total Lecture Hours: 72

Course Outcomes:

CO1: Explain the fundamental concepts of congruences and carryout different mathematical operations modulo an integer.

CO2: Discuss the basics of cryptography and compare the different encryption and decryption techniques.

CO3: Classify the different conic sections and to describe them in Cartesian and polar coordinates

CO4: Compute the Laplace transform and inverse Laplace transform of a function and find the solution of differential equations.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module 1 **(20 Hrs)**

Number Theory:

Basic properties of congruence , Linear congruences and Chinese remainder theorem (statement and problems only), Fermat's little theorem and pseudo primes, Wilson's theorem, The sum and number of divisors, Euler's phi-function,

(Chapter 4 – s ections 4.2,4.4 Chapter 5- sections 5.2,5.3 and Chapter 6- section ,chapter7-section 7.2 of text 1)

Module 2 **(15 Hrs)**

Introduction to Cryptography:

From Caesar Cipher to Public key Cryptography, the Knapsack Cryptosystem

(Sections 10.1, 10.2 only of text 1)

Module 3 **(20 Hrs)**

Laplace transforms:

Laplace transform, Linearity of Laplace transform, First shifting theorem, Existence of Laplacetransform, Transforms of derivatives, Solution of ordinary differential equation & initial value problem, Laplace transform of the integral of a function, Convolution and Integral equations. (Sections 6.1, 6.2 and 6.5 of text 2)

Module 4 **(17 Hrs)**

Conic Sections:
Conic Sections & quadratic equations, Classifying Conic Sections by eccentricity, quadratic equations & rotations, Conics & parametric equations;Cycloid, Polar coordinates, Graphing in Polar coordinates, Areas & lengths in Polar coordinates,
Conic Sections in Polar coordinates

(Chapter 10 of text 2)

SEMESTER III

Course Code	Course Title	Credits	Course Type
EN3A05B18	Literature And/As Identity	4	Common course I
MA3A05B18	Drisyakalasahithyam	4	Common course II
HN3A05B18	Naatak Aur Lambi Kavita		
FR3A05B18	An Advanced Course In French -I		
ST3C01B18	Probability Distributions	4	Complementary course I
PH3C01B18	Modern Physics, Basic Electronics And Digital Electronics	3	Complementary course II
PH4CP01B18	Practical	-	Complementary II Practical
MT3B03B18	Calculus	4	Core course-3

SEMESTER III

COMMON COURSE I

EN3A05B18 – LITERATURE AND/AS IDENTITY

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1. Explain how literature problematizes identity.

CO2. Analyze the quest for identity in the Indian diaspora.

CO3. Illustrate the effects of partition and communal violence in South Asian Literature.

CO4. Critique the social construction of identity.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module 1 (Diasporic Identities) (18 hours)

Agha Shahid Ali: Postcard from Kashmir
Amy Tan: Mother Tongue
Imtiaz Dharker: At the Lahore Karhai
Chitra Banerjee Divakaruni: Indian Movie, New Jersey

Module 2 (South Asian Identities) (18 hours)

Sadat Hassan Manto: The Dog of Tetwal
Intizar Hussain: A Chronicle of Peacocks
Selina Hossain: Fugitive Colours
Punakante Wijenaike: That Deep Silence

Module 3 (Life Writings) (18 hours)

Malcolm X: ―Nightmare, excerpt from *The Autobiography of Malcolm X*.
Sashi Deshpande: Learning to be a Mother in *Janani– Mothers, Daughters, Motherhood*, (Ed.) Rinki Bhattacharya.

Module 4 (Indigenous Identities (18 hours)

Leslie Marmon Silko: Lullaby
Garhwali Songs in *Painted Words- An Anthology of Tribal Literature* – Edited by G.N. Devy
Mamang Dai: Pinyar the Widow (Excerpt from Legends of Pensam)

Module 5 (Alter Identities)(18 hours)

Nathaniel Hawthorne: The Birth Mark
Girish Karnad: Hayavadana (Excerpt)
Ruskin Bond: The Girl on the Train

സെമസ്റ്റർ : മൂന്ന്
കോമൺ കോഴ്സ് മലയാളം
ബി.എ/ബി.എസ്.സി (റഗുലർ), ബി.എസ്.സി സൈക്കോളജി (സ്വാശ്രയം)
MA3A05B18- ദൃശ്യകലാസാഹിത്യം

Credits: 4

Total Lecture hours: 90

പഠനനേട്ടങ്ങൾ (Course Outcomes)

CO1:കേരളീയരംഗകലാപാരമ്പര്യവും സംസ്കാരപരിണാമവും ചർച്ചചെയ്യുക (Understand)

CO2:ദൃശ്യകലാപഠനത്തിലൂടെ കേരളീയസംസ്കാരപരിണാമം, ചരിത്രം എന്നിവ അപഗ്രഥിക്കുക (Analyze)

CO3:കഥാപാത്രപഠനത്തിലൂടെ സമകാലികവിഷയങ്ങളെ വിലയിരുത്തുക (Evaluate)

CO4: ഇതിവൃത്ത പഠനത്തിലൂടെ കഥാപാത്രങ്ങളെ വിമർശനാത്മകമായി നിരൂപണം ചെയ്യുക (Apply)

CO5:സമകാലികസംഭവങ്ങളെ അടിസ്ഥാനമാക്കി നാടകം, ഹ്യസ്വചിത്രം എന്നിവ തയാറാക്കുക. (Create)

Mapping of Course Outcomes with Program Specific Outcomes

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

പാഠഭാഗങ്ങൾ

ഖണ്ഡം ഒന്ന് - സംസ്കൃത നാടകം 20 മണിക്കൂർ.

മലയാളശാകുന്തളം നാലാമങ്കം - എ. ആർ രാജ രാജ വർമ

ഖണ്ഡം രണ്ട് - ആട്ടക്കഥ 15 മണിക്കൂർ

നളചരിതം (ഒന്നാം ദിവസം) - ഉണ്ണായി വാര്യർ (തുടക്കം മുതൽ ഹംസം നളനിലുള്ള പ്രണയം ഉറപ്പിക്കുന്നത് വരെ)

ഖണ്ഡം മൂന്ന് - തുള്ളൽ 15 മണിക്കൂർ

കല്യാണസൗഗന്ധികം (ശീതങ്കൻ തുള്ളൽ) - കുഞ്ചൻ നമ്പ്യാർ - (ഭീമൻറെ കദളീവന പ്രവേശം മുതൽ ശ്രീരാമ ദാസൻറെ വംശേ ജനിക്കയാൽ പാരം നിനക്കു മഹംഭാവമിങ്ങനെ' വരെ ഭാഗങ്ങൾ

ഖണ്ഡം നാല് - മലയാള നാടകം 20 മണിക്കൂർ

1128 ൽ ക്രൈം 27 - സി. ജെ. തോമസ്

ഖണ്ഡം അഞ്ച്- സിനിമ 20 മണിക്കൂർ

നിർമാല്യം തിരക്കഥ - എം. ടി . വാസുദേവൻ നായർ

SEMESTER III

COMMON COURSE – HINDI

HN3AO5B18 - NAATAK AUR LAMBI KAVITHA

Credits – 4
Total Lecturer Hours - 90

Course Outcomes:

CO1: Summarise the poems and Illustrate the socio-political and cultural concerns of the Author.

CO2: Discuss the Authors contribution to Hindi Literature.

CO3: Analyse the characterisation of the Drama Konark.

CO4: Critique excerpts of the poems and Drama.

CO5: Communicate in oral and written form of Hindi with competence.

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

Syllabus content

Module- I 22 Hours

Syllabus- Konark Introduction & Act 1 (Jagdishchandra Mathur)

Module- II 24 Hours

Syllabus- - Konark Act 2 & 3(Jagdishchandra Mathur)

Module- III 22 Hours

Syllabus-

Nagayi Mahura (Thrilochan)

Shahenshah Ki Neend (Umashankar Chaudhary)

Dhaaba- Nilesh Raghuvanshi

Module- IV 22 Hours

Syllabus-

Ithni Door Mat Bhyahna Baba- Nirmala Putul

Jawahar Tunnel – Agnishekhar

SEMESTER III

COMMON COURSE II

FR3A05B18- AN ADVANCED COURSE IN FRENCH - I

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Describe topics such as physical appearance of a person, sports and entertainments.

CO2: Articulate the concepts to express ones opinion in a specific situation.

CO3: Compose conversations based on scenarios which help while shopping.

CO4: Articulate the concepts to give advice and instructions and to invite a person in a specific situation.

CO5: Construct conversations based on scenarios which help during medical and health consultations.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I **(30 hours)**

Jeunes artistes: Décrire une personne - Exprimer une opinion - La description physique - Les spectacles

Module II **(30 hours)**

Tenue de soirée : Inviter - Les vêtements - Les chaussures - Les couleurs - Les matières

Module III **(30 hours)**

Faites du sport ! : Donner des conseils - Les parties du corps - Les mouvements - Les sports

SEMESTER III

COMPLEMENTARY COURSE

ST3C01B18 / ST3B03B18 -PROBABILITY DISTRIBUTIONS

Credits: 4
Total lecture hours : 90

Course Outcomes:

CO1: Describe the general characteristics of random variables.

CO2: Explain various properties of some important discrete random variables.

CO3: Establish the applications of continuous distributions.

CO4: Illustrate the uses of Tchebycheff's Inequality, Laws of Large Numbers and Central limit theorem.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I **(25 hours)**

Mathematical Expectation – Expectation of a Random Variable, Moments in terms of Expectations, Moment Generating Functions (m.g.f.) and its properties. Characteristic Functions and its Simple Properties, Conditional Expectation.

Module II **(25 hours)**

Discrete Probability Distributions – Uniform: Geometric; Bernoulli; Binomial; Hyper geometric; Poisson; Fitting of Distributions (Binomial and Poisson). Properties – Mean, Variance, m.g.f., Additive property; recurrence relation for moments (binomial and Poisson) Memorylessness property of Geometric distribution.

Module III **(25 hours)**

Continuous distributions – Uniform; Exponential; Gamma; Beta (type I and II); Normal; Standard Normal – definitions, Mean, Variance, m.g.f., Additive property, Memorylessness property of exponential distribution Fitting of Normal, Use of Standard Normal Tables for Computation of Various Probabilities.

Module IV **(15 hours)**

Tchebycheff's Inequality, Weak Law of Large Numbers, Bernoulli's Law of Large Numbers, Central Limit Theorem (Lindberg-Levy form) with proof.

SEMESTER III
COMPLEMENTARY COURSE

PH3C01B18 - MODERN PHYSICS, BASIC ELECTRONICS AND DIGITALELECTRONICS
(Complementary Course for B.Sc. Mathematics)

Credits: 3
Total lecture hours - 54 hrs

Course Outcomes:

CO1: Discuss different atom models used to study spectroscopy and estimate the spectral characteristics.

CO2: Discuss emergence of quantum mechanics and solve photoelectric equation, energy and uncertainties in position/momentum of a particle in a box.

CO3: Explain the ground state properties of the nucleus for the study of the nuclear structure behavior

CO4: Construct rectifiers, voltage regulators, transistors and express different number systems and Boolean algebra in digital circuitry design.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I (16 hours)

Atom models & Spectroscopy

Thomson's model - Rutherford's nuclear atom model (qualitative) - Bohr atom model – Bohr radius – total energy of the electron – Bohr's interpretation of Hydrogen atom- Sommerfeld's relativistic atom model – elliptical orbits of Hydrogen (qualitative) – Sommerfeld's relativistic theory – fine structure of Hα line - Vector atom model – quantum numbers associated with vector atom model – coupling scheme (qualitative) - optical spectra – spectral terms – spectral notation – selection rules.

Molecular spectra – theory of origin of pure rotational spectra of rigid diatomic molecule - Raman effect – experimental study of Raman effect – quantum theory of Raman effect-- fluorescence and phosphorescence.

Module II (20 hours)

Quantum mechanics (12 hrs)

Introduction – breakdown of classical physics – black body radiation and Planck's quantum hypothesis (qualitative) – photoelectric effect – Einstein's explanation of photoelectric effect

– de Broglie hypothesis – matter wave – Davisson Germer experiment – uncertainty principle (derivation and application not required) - wave packet – wave function – properties of wave function – probabilistic interpretation of wave function – normalisation condition – time independent Schrödinger equation – particle in a box problem.

Nuclear Physics (8hrs)

Classification of nuclei - general properties of nucleus - binding energy - nuclear stability - theories of nuclear composition - nuclear forces - magic numbers - natural radioactivity - alpha- beta & gamma rays - properties of alpha rays - properties of beta rays - properties of gamma rays- fundamental laws

of radioactivity – Soddy Fajan's displacement law - law of radioactive disintegration – half life - mean life - units of radioactivity - law of successive disintegration - radioactive dating.

Module III (18 hours)

Basic Electronics (11 hrs)

Energy bands in solids - conduction in solids – semiconductors - majority and minority charge carriers - intrinsic conduction. PN junction diodes – biasing - diode equation (derivation not required), diode parameters, diode ratings - diode characteristics – junction break down. Rectifiers - half wave, full wave and bridge rectifiers. Zener diode characteristics – voltage regulation. Bipolar junction transistors – biasing - transistor currents - transistor circuit configurations - common emitter configurations.

Digital electronics (7 hrs)

Different number systems – decimal - binary – octal - hexa decimal number systems – conversion between different number systems – binary mathematics – addition and subtraction – basic theorems of Boolean algebra – de Morgan's theorems – AND, OR, NOT, NAND, NOR, XOR gates – truth tables – half adder and full adder (qualitative).

SEMESTER III

CORE COURSE

MT3B03B18 - CALCULUS

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Compute the higher order derivatives of single and multivariable functions.

CO2 : Determine the series expansions of functions using Taylor's and Maclaurin's series.

CO3: Estimate the extreme values of a continuous function of several variables with constrained and unconstrained domains.

CO4 : Apply Integral calculus to compute the length of the plane curves and area between curves. .

CO5: Employ the concept of multiple integrals in mensuration of solids.

CO6 : Evaluate multiple integrals by transforming into various coordinate systems.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module 1 : Differential Calculus (30Hrs)

Successive Differentiation. Expansion of functions using Maclaurin's theorem and Taylor's theorem. Concavity and points of inflexion

.(Chapter - 5, Chapter – 6, Chapter 13 of text 2)

Module 2 : Partial Differentiation (20 Hrs)

Partial derivatives, The chain rule., Extreme values and saddle points, Lagrange multipliers, Partial derivatives with constrained variables.
(Section 14.3, 14.4, 14.7, 14.8, 14.9 of text 1)

Module 3 : Integral Calculus (20 Hrs)

Substitution and area between curves, volumes by slicing and rotation about an axis. Volumes by cylindrical shells, Lengths of Plane Curves, Areas of surfaces of Revolution and the theorems of Pappus.
(Section 5.6, 6.1, 6.2, 6.3, 6.5 of text 1)

Module 4 : Multiple Integrals (20 Hrs)

Double integrals, Areas, Double integrals in polar form, Triple integrals in rectangular coordinates, Triple integrals in cylindrical and spherical coordinates, substitutions in multiple integrals.

(Section 15.1, 15.2 (area only) 15.3, 15.4, 15.6, 15.7 of text 1)

SEMESTER IV

Course Code	Course Title	Credits	Course Type
EN4A06B18	Illuminations	4	Common course I
MA4A06B18	Malayala Gadhyarachanakal	4	Common course II
HN4A06B18	Gadya Aur Ekanki		
FR4A06B18	An Advanced Course In French -Ii		
ST4C01B18	Statistical Inference	4	Complementary course I
PH4C01B18	Physical Optics, Laser Physics And Dielectrics	3	Complementary course II
PH4CP01B18	Practical	2	Complementary II Practical
MT4B04B18	Vector Calculus, Theory Of Equations & Matrices	4	Core course-4

SEMESTER IV

COMMON COURSE I

EN4A06B18 – ILLUMINATIONS

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Discover life lessons through the study of life sketches.

CO2: Explain multiple perspectives of life from the viewpoint of great minds.

CO3: Apply the language skills acquired in academic and non-academic contexts.

CO4: Analyze creative texts with a special focus on human emotions and the spirit of survival.

CO5: Critique the conventional notions of happiness, courage and failure.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content :

Module I- Life Sketches **(18 hours)**

Helen Keller: Three Days to See

Jesse Owens: My Greatest Olympic Prize

Thus Spoke Sudarshan: An Interview with God's Own Physicist Compiled from E C G Sudarshan's interviews

Module II- Essays **(18 hours)**

Stephen Leacock: Are the Rich Happy?

A.G. Gardiner: On Courage

Module III- Speeches **(18 hours)**

Lafcadio Hearn: On Reading

J.K. Rowling: The fringe benefits of failure and the importance of imagination

Chimamanda Ngozi Adichie: An Ode to Makeup

Module IV- Short Stories **(18 hours)**

Oscar Wilde: The Nightingale and the Rose

George Orwell: Roucolle, the Miser

John Galsworthy: Quality

Alice Walker: Everyday Use

Module VI- Poems **(18 hours)**

William Ernest Henley: Invictus

Robert Frost: The Road Not Taken

Kahlil Gibran: Of Good and Evil

Maya Angelou: Still I Rise

SEMESTER IV

COMMON COURSE II

FR4A06B18-AN ADVANCED COURSE IN FRENCH II

Credits: 4

Total Lecture Hours: 90 hours

Course Outcomes:

CO1: Develop language, vocabulary and grammar skills.

CO2: Prepare conversations based on various situations and speak about them.

CO3: Articulate the concepts to express one's opinion in a specific situation.

CO4: Ask questions to get meaningful responses in effective communication.

CO5: Describe events or topics based on various daily life situations such as persons, family, time schedules, visiting countries.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I **(30 Hours)**

En voiture Proposer – Accepter – Refuser – Faire des projets- Les routes – La voiture

Module II **(30 Hours)**

Sur la route Exprimer l'obligation/ L'interdiction – La météo– Le temps

Module III **(30 Hours)**

Raconter un emploi du temps Se justifier – Le tourisme - Les pays et les continents

SEMESTER IV

COMMON COURSE II

HN4AO6B18 - GADYA AUR EKAANKI

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Discuss the authors contribution to Hindi Literature.

CO2: Summarise the central theme and other relevant details of all literary works.

CO3: Illustrate the socio-political and cultural concerns of the Author.

CO4: Critique excerpts of the Prose and One Act Plays.

CO5: Communicate in oral and written form of Hindi with competence.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module- I **(22 hours)**

1. Aaiye hum vriksh devta ki aaradhana karen- Dr. Kishorilal vyas
2. Raajniti ka batvaara- Harishankar parsai
3. Deep daan – Ramkumar verma

Module- II **(24 hours)**

4. Himachadit uttung shikhar aur dhuli hariyali – Vijay kumar sandesh
5. Kaphan chor ka beta – Ushabaala
6. Bahu ki vida- Vinod rastogi

Module- III **(22 hours)**

7. Jab mai fail hua- Ramkumar Verma
8. Jaan se pyare – Mamta Kaaliya
9. Sati – G.K. Harjeeth

Module- IV **(22 hours)**

10. Jab intizar hussain apni janmabhoomi laute – Azhar vajahat
11. Hari ghaas par ghante bhar – Surendra verma

SEMESTER IV

COMMON COURSE II

MA4A06B18 - മലയാള ഗദ്യരചനകൾ

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: മലയാള ഗദ്യസാഹിത്യത്തിലെ സമകാലിക വിഷയങ്ങൾ ചർച്ച ചെയ്യുക

CO2: കേരളീയസംസ്കാര - കലാപരിണാമം , ചരിത്രം, ആത്മകഥ എന്നിവ അപഗ്രഥിക്കുക

CO3: ഗദ്യപാഠങ്ങളിലൂടെ സമകാലികവിഷയങ്ങളെ വിലയിരുത്തുക

CO4: സമകാലിക സാമൂഹിക വിഷയങ്ങളെ വിമർശനാത്മകമായി നിരൂപണംചെയ്യുക

CO5: വിവിധ വിഷയങ്ങളെ ആസ്പദമാക്കി ലേഖനങ്ങൾ തയാറാക്കുക. സ്വാനുഭവങ്ങൾ വിവിധ ആഖ്യാന രൂപങ്ങളിലൂടെ ആവിഷ്കരിക്കുക.

Mapping of Course Outcomes with Program Specific Outcomes

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

പാഠഭാഗങ്ങൾ

പുസ്തകങ്ങൾ : ഗദ്യാരാമം , ഓർമ്മകൾ ചന്ദനഗന്ധം പോലെ

ഖണ്ഡം ഒന്ന് **15 മണിക്കൂർ**

1. കാളിദാസനും കാലത്തിൻറെ ദാസൻ - ജോസഫ് മുണ്ടശ്ശേരി
2. മേഘസന്ദേശവിവർത്തനങ്ങൾ - ഡോ. എൻ .അജയകുമാർ
3. മാതൃഭാഷയിലേക്കു വീണ്ടും - എൻ .വി . കൃഷ്ണവാര്യർ

ഖണ്ഡം രണ്ട് **20 മണിക്കൂർ**

1. വാക്കുകളുടെ വിസ്മയം - എം .ടി.വാസുദേവൻനായർ
2. മാറുന്ന മലയാള സംസാരഭാഷ - ടി .ബി .വേണുഗോപാലപ്പണിക്കർ
3. നമ്മുടെ അടുക്കള തിരിച്ചുപിടിക്കുക - സാറാ ജോസഫ്
4. കലയും കലാദർശനവും - ഡോ. ജെ . ഉണ്ണികൃഷ്ണപിള്ള

ഖണ്ഡം മൂന്ന് **15 മണിക്കൂർ**

1. ചെമ്പൈ വൈദ്യനാഥ ഭാഗവതർ സംഗീതത്തിലെ സിംഹനാദം - ഇന്ദിരാമേനോൻ
2. ഈശ്വരപിള്ളയെ ആരോർക്കുന്നു - പി. കെ . രാജശേഖരൻ
3. രവിവർമ്മ - വിജയകുമാർ മേനോൻ

ഖണ്ഡം നാല് **15 മണിക്കൂർ**

1. പ്രകാശത്തിൻറെ ആയിരം തടവറകൾ - ജീവൻ ജോബ് തോമസ്
2. ജനാധിപത്യ വിദ്യാഭാസം ചില ചിന്തകൾ - ഡോ. കെ .എൻ. പണിക്കർ
3. ഞങ്ങൾ നിങ്ങൾക്ക് ഭൂമി വിറ്റാൽ - സിയാറ്റിൽ മൂപ്പൻ

ഖണ്ഡം അഞ്ച് **25 മണിക്കൂർ**

1. ഓർമ്മകൾ ചന്ദനഗന്ധം പോലെ - ബി. സരസ്വതിയമ്മ

SEMESTER IV

COMPLEMENTARY COURSE

ST4B04B18 - STATISTICAL INFERENCE

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO 1: Explain the concepts of Statistic and Sampling distribution.

CO 2: Illustrate the methods of estimating parameters of a population.

CO 3: Describe the procedure of testing of hypotheses.

CO 4: Explain standard error and testing procedures for parameters of a Normal Population using large and small samples.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I (20 hours)

Sampling Distributions – definition, Statistic, Parameter, Standard Error, Sampling Distributions of Mean and Variance, χ^2, t and F (without derivation), properties, Inter relationships.

Module II (30 hours)

Concepts of Estimation, Types of Estimation – Point Estimation; Interval Estimation, Properties of Estimation – Unbiasedness, Efficiency; Consistency; Sufficiency. Methods of Estimation – MLE, Methods of Moments, Method of Minimum Variance, Cramer Rao Inequality (without proof), Interval Estimation for Mean, Variance and Proportion.

Module III (20 hours)

Testing of hypothesis- Statistical hypothesis, Simple and composite hypothesis Null and Alternate hypothesis, Type I and Type II errors, Critical Region, Size of the test, P value, Power, Neyman Pearson approach

Module IV (20 hours)

Large Sample tests – Z test, Chi-Square test-goodness of fit, test of independence. Small sample tests –Normal tests, t - test, Chi-square test, F- test.

SEMESTER IV

COMPLEMENTARY COURSE

PH4C01B18: PHYSICAL OPTICS, LASER PHYSICS AND DIELECTRICS

Credits: 3

Total lecture hours - 54 hrs

Course Outcomes:

CO1: Interpret interference of light in thin film, diffraction at straight edge and in grating.

CO2: Explain different types of polarised light and compute thickness of retardation plates.

CO3: Examine basic principles of lasers, holography and Fiber Optic communication.

CO4: Examine the behaviour of dielectrics in the presence of electric field.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module I **(20 hours)**

Interference **(12 hrs)**

Interference of light - Principle of superposition - conditions for maximum and minimum intensities - coherent sources - Interference by division of wave front and division of amplitude - Young's double slit experiment (division of wave front) – Expression for fringe width - Newton's rings by reflected light (division of amplitude) - measurement of wavelength of sodium light by Newton's rings - interference in thin films.

Diffraction **(8 hrs)**

Introduction – Difference between Interference and diffraction - Fresnel and Fraunhofer diffraction - Fresnel Diffraction at a straight edge - Theory of plane transmission grating - Determination of wavelength (normal incidence) – resolving power - dispersive power.

Module II **(10 hours)**

Polarization (10 hrs)

Polarization - preferential direction in a wave - polarized light - natural light - production of linearly polarized light – polarization by reflection – Brewster's law - polarization by double refraction – calcite crystal – optic axis – principal section – positive and negative crystals – Huygen's explanation of double refraction - phase difference between O and E rays – types of polarization – retardation plates (only half wave plate and quarter wave – Nicol prism – Malus's law.

Module III **(24 hours)**

Lasers **(10 hours)**

Interaction of light and matter - quantum behavior of light - energy levels – population - thermal equilibrium - absorption and emission of light - the three processes - Einstein relation - condition for large stimulated emissions - condition for light amplification - population inversion – pumping - active medium - metastable state - pumping schemes - solid state lasers – ruby laser &yag laser - gas laser – helium-neon laser - applications (basic ideas).

Holography **(1 hour)**

Holography –introduction – principle- method-advantages and applications

Fibre optics **(3 hours)**

Introduction-optical fibre-critical angle of propogation-acceptance angle-types of optical fibres-single mode –multimode-graded index fibre-fibre optic communication system.

Dielectrics **(10 hours)**

Dielectrics- polar and non-polar dielectrics- polarization- sources of polarization-Gauss's law in dielectrics- permittivity- dielectric displacement vector- dielectric constant susceptibility, ferro-electricity (qualitative).

SEMESTER IV

PH4CP01B18 - COMPLEMENTARY PHYSICS PRACTICALS

Credit: 2
Total lecture hours - 72

Course Outcomes:

CO1: Interpret general experiments in elasticity and magnetism.

CO2: Construct rectifiers, logic gates, amplifiers and analyse transistor characteristics, Potentiometer and Carey Foster's Bridge.

CO3: Determine wavelength of light source, refractive index of material and dispersive Power.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content :

1. Non-uniform bending-Young's modulus-Pin and Microscope method
2. Field along the axis of circular coil- Variation of magnetic field and determination of B_H
3. Carey Foster's Bridge - Measurement of resistivity
4. Liquid lens - Refractive index of liquid
5. Searle's vibration Magnetometer-magnetic moment
6. Tangent Galvanometer – Ammeter calibration
7. Spectrometer – Prism – Dispersive power
8. Potentiometer-Calibration of low range ammeter
9. Construction of full wave rectifier with and without filter – Ripple factor and Load regulation
10. Construction of regulated power supply using Zener diode
11. Uniform bending – Young's modulus-Optic lever method
12. Torsion pendulum (Equal mass method) - Rigidity modulus and Moment of Inertia
13. Fly wheel - Moment of Inertia
14. Static Torsion - Rigidity modulus
15. Spectrometer - Grating Dispersive power
16. Newton's rings - Wave length
17. Deflection and Vibration Magnetometer- m & Bh
18. Conversion of Galvanometer into voltmeter
19. Transistor characteristics- CE configuration
20. Gates – AND - OR- NOT- verification of truth table
21. Construction of CE amplifier – gain

SEMESTER IV

CORE COURSE

MT4B04B18- VECTOR CALCULUS, THEORY OF EQUATIONS & MATRICES

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Determine the equations of lines and planes in space and apply vector differentiation in the study of motion.

CO2 : Compute line integrals and surface integrals and apply them to determine the various characteristics of a vector field.

CO3: Analyze an algebraic equation and evaluate its roots using different methods.

CO4: Illustrate the properties of matrices and compute the solution of linear equations using matrix algebra.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module 1(A quick review) **(20 Hrs)**

Lines and planes in space., Vector functions Arc length and Unit tangent vector, Curvatureand Unit normal vector, torsion and Unit Binormal vector, Directional derivatives and gradient vectors , tangent planes and normal lines (ONLY).

Module 2 Integration in Vector Fields: **(30 Hrs)**

Line integrals, Vector fields and line integrals: Work, Circulation and Flux, Path Independence, Conservative Fields and Potential Functions (Proofs of theorems excluded), Green's theorem in the plane (Statement and problems only), Surfaces and Area: Parameterisations of surfaces, Implicit surfaces, Surface integrals, Stokes' theorem (Statement and simple Problems only), Divergence theorem only (Statement and Problems only) Gauss' law onwards are excluded.

Module 3 Theory of Equations: **(20Hrs)**

Statement of fundamental Theorem of algebra. Deduction that every polynomial of degree n has n and only n roots. Relation between roots and coefficients. Transformation of equations. Reciprocal equations.

Module 4 Matrices: **(20Hrs)**

Rank of a Matrix, Non-Singular and Singular matrices, Elementary Transformations, Inverse of an elementary Transformations, Equivalent matrices, Row Canonical form, Normal form, Elementary matrices only.

Systems of Linear equations: System of non-homogeneous, solution using matrices, Cramer's rule, system of homogeneous equations, Characteristic equation of a matrix; Characteristic roots and characteristic vectors. Cayley-Hamilton theorem (statement only) and simple applications

SEMESTER V

Course Code	Course Title	Credits	Course Type
MT5B05B18	HUMAN RIGHTS AND MATHEMATICS FOR ENVIRONMENTAL STUDIES.	4	CORE COURSE
MT5B06B18	REAL ANALYSIS-I	4	CORE COURSE
MT5B07B18	DIFFERENTIAL EQUATIONS	4	CORE COURSE
MT5B08B18	ABSTRACT ALGEBRA	4	CORE COURSE
MT5D01aB18	APPLICABLE MATHEMATICS	3	OPEN COURSE
MT5D01bB18	MATHEMATICAL MODELLING	3	OPEN COURSE
MT5D01cB18	FINANCIAL MATHEMATICS	3	OPEN COURSE
MT5D01dB18	MATHEMATICAL ECONOMICS	3	OPEN COURSE

SEMESTER V

CORE COURSE-5

MT5B05B18 - HUMAN RIGHTS AND MATHEMATICS FOR ENVIORNMENTAL STUDIES

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Discuss different ecosystems, natural resources, bio diversity etc and the need for protecting/ preserving them.

CO2: Develop awareness necessary to address complex environmental issues with a focus on sustainability.

CO3: Illustrate the interconnection between Mathematics and Nature.

CO4: Explain about the development and evolution of Human Rights in India.

CO5: Describe different policies and movements for environmental protection.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus content

Module 1 **(20Hrs)**

Unit 1: Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources

Renewable and non-renewable resources: Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification

Role of individual in conservation of natural resources.

Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems

Concept of an ecosystem

Structure and function of an ecosystem

Producers, consumers and decomposers

Energy flow in the ecosystem

Ecological succession

Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the given ecosystem:- Forest ecosystem

(Relevant sections of text 2 & 3)

Module 2 **(25Hrs)**

Unit 1: Biodiversity and its conservation

Introduction

Bio-geograhical classification of India

Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.

India as a mega-diversity nation

Hot-sports of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts

Endangered and endemic species of India

Unit 2: Environmental Pollution

Definition,Causes, effects and control measures of: -

a) Air pollution

b) Water pollution

c) Soil pollution

d) Marine pollution

e) Noise pollution

f) Thermal pollution

g) Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution

Pollution case studies

Disaster management: floods, earthquake, cyclone and landslides.

Unit 3: Social Issues and the Environment

Urban problems related to energy

Water conservation, rain water harvesting, watershed management

Resettlement and rehabilitation of people: its problems and concerns, Case studies

Environmental ethics: Issues and possible solutions

Climate change, global warming, acid rain, ozone layer depletion , nuclear accidents andholocaust, Case studies

Consumerism and waste products

Environment Protection Act

Air (Prevention and Control of Pollution) Act

Water (Prevention and control of Pollution) Act

Wildlife Protection Act

Forest Conservation Act

Issues involved in enforcement of environmental legislation

Public awareness

Module 3 **(10Hrs)**

Fibonacci Numbers in nature:

The rabbit problem, Fibonacci numbers, recursive definition, Lucas numbers, Different types of Fibonacci and Lucas numbers. Fibonacci numbers in nature: Fibonacci and the earth, Fibonacci and flowers, Fibonacci and sunflower, Fibonacci, pinecones, artichokes and pineapples, Fibonacci and bees, Fibonacci and subsets, Fibonacci and sewage treatment, Fibonacci and atoms, Fibonacci and reflections, Fibonacci, paraffins and cycloparaffins, Fibonacci and music, Fibonacci and compositions with 1's and 2's (excluding Fibonacci and poetry, Fibonacci and electrical networks)

Golden Ratio

The golden ratio, mean proportional, a geometric interpretation, ruler and compass construction, Euler construction, generation by Newton's method. The golden ratio revisited, the golden ratioand human body, golden ratio by origami, Differential equations, Gattei's discovery of golden ratio, centroids of circles.

Module 4 **(12Hrs)**

Human rights:

Unit 1: Human Rights: An Introduction to Human Rights, Meaning, concept and Development, Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights).

Unit 2: Human Rights and United Nations

Contributions, main human rights related organs - UNESCO,UNICEF, WHO, ILO, Declarations for women and children, Universal Declaration of Human Rights.

Human Rights in India

Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

Unit 3: Environment and Human Rights

Right to Clean Environment and Public Safety: Issues of Industrial Pollution, Prevention, Rehabilitation and Safety Aspect of New Technologies such as Chemical and Nuclear Technologies, Issues of Waste Disposal, Protection of Environment

Conservation of natural resources and human rights Reports, Case studies and policy formulation. Conservation issues of western ghats- mention Gadgil committee report, Kasthurirengan report. Over exploitation of groundwater resources, marine fisheries, sand mining etc.

Internal: Field study

Visit to a local area to document environmental grassland/ hill /mountain

Visit a local polluted site – Urban/Rural/Industrial/Agricultural Study of

common plants, insects, birds etc.

Study of simple ecosystem-pond, river, hill slopes, etc.

(Field work Equal to 5 lecture hours)

SEMESTER V

CORE COURSE-6

MT5B06B18 -REAL ANALYSIS I

Credits: 4

Total Lecture Hours: 108

Course Outcomes:

CO1 : Discuss the fundamental properties of the real numbers that support the formal development of real analysis.

CO2 : Describe basic topological concepts and characterizations of real number system such as the notions of open and closed sets.

CO3 : Analyze the real sequences ,their convergence, some basic and significant theorems involving sequences and their applications.

CO4 : Explain elementary metric space theory including continuity, connectedness, compactness and completeness.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus content :

Module 1 **(18Hrs)**

Intervals, Bounded and unbounded sets, supremum, infimum. Order completeness in R. Archimedian property of real numbers. Dedekinds form of completeness property.

Module 2 **(30Hrs)**

Neighbourhood of a point. Interior point of a set. Open set. Limit point of a set. Bolzano Weierstrass theorem for sets. Closed sets, closure of a set. Dense sets. Countable and uncountable sets.

Module 3 **(35Hrs)**

Real sequences. The range, bounds of a sequence. Convergence of sequences. Some theorems, limit points of a sequence. Bolzano Weierstrass theorem for sequences. Limit interior and superior. Convergent sequences. Cauchy's general principle of convergence. Cauchy's sequences. Statements of theorem without proof in algebra of sequences. Some important theorems and examples related to them. Monotonic sequences, subsequences.

Module 4 **(25Hrs)**

Metric Spaces: Definitions & examples, Open & Closed Sets, Convergence & Completeness, Continuity & Uniform Continuity

SEMESTER V

CORE COURSE-7

MT5B07B18- DIFFERENTIAL EQUATIONS

Credits: 4

Total Lecture Hours: 108

Course Outcomes:

CO1 : Classify different types of differential equations .

CO2 : Construct differential equations by eliminating constants or functions.

CO3: Compute the general and particular solutions of first order and higher order differential equations and find the orthogonal or oblique trajectories.

CO4: Apply power series method to find the solutions of ordinary differential equations

CO5: Solve partial differential equations using the method of grouping and the multiplier method .

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus content :

Module 1 **(25Hrs)**

Ordinary differential equations:

Exact differential equations and integrating factors (proof of theorem 2.1 excluded), separable equations and equations reducible to this form, linear equations and Bernoulli equations, special integrating factors and transformations. Orthogonal and oblique trajectories.

Module 2 **(30Hrs)**

Basic theory of linear differential equations. The homogeneous linear equation with constant coefficients. The method of undetermined coefficients, Variation of parameters, The Cauchy – Euler equation.

Module 3 **(33 Hrs)**

Power series solution about an ordinary point, solutions about singular points, the method of Frobenius, Bessel's equation and Bessel Functions, Differential operators and an operator method.

Module 4 **(20 Hrs)**

Partial Differential equations:

Surfaces and Curves in three dimensions, solution of equation of the form $Pp + Qq = R$

Origin of first order and second order partial differential equations,

Linear equations of the first order, Lagrange's method

SEMESTER V

CORE COURSE-8

MT5B08B18- ABSTRACT ALGEBRA

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Develop the concepts of binary operations, groups and subgroups.

CO2: Analyze cyclic groups, permutation groups and alternating groups.

CO3: Interpret cosets, factor groups and fundamental homomorphism theorem.

CO4: Differentiate between groups, rings, fields and integral domains.

CO5: Interpret ideals and factor rings.

CO6: Solve problems related to groups, rings and fields.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus content :

Module 1 **(20Hrs)**

Binary Operations; Isomorphic Binary Structures; Groups; Subgroups

Module 2 **(30Hrs)**

Cyclic Groups; Groups of Permutations; Orbits, Cycles and the Alternating Groups

Module 3 **(25Hrs)**

Cosets and the Theorem of Lagrange; Homomorphisms; Factor Groups; Simple Groups

Module 4 **(15Hrs)**

Rings and Fields; Integral Domains. Ideals and factor rings

SEMESTER V

OPEN COURSE

MT5D01aB18- APPLICABLE MATHEMATICS

Credits: 3

Total Lecture Hours: 90

Course Outcomes:

CO1: Apply basic mathematical concepts (quadratic equations, logarithms, trigonometry, ratio, proportion, percentage, average, profit and loss, elementary algebra) for problem solving and logical reasoning.

CO2: Differentiate between permutations and combinations.

CO3: Devise mathematical solutions to real life problems relating to investment, time and work, work and wages, time and distance and elementary mensuration.

CO4: Compute the derivative and integral of different functions.

CO5: Determine the probabilities of events.

Syllabus content :

Module 1 **(18 Hrs)**

Types of numbers, Quadratic equations (Solution of quadratic equations with real roots only), Logarithms – All rules without proof, Multiplication and division of numbers, Evaluating expressions of the form xp/q, x any real number, p & q are integers, Permutations and combinations – simple applications, Trigonometry introduction, Values of trigonometric ratios , Heights and distances – Simple cases - (application of sinx, cosx, tanx, and their reciprocals only). Two

dimensional geometry- Introduction, plotting points and drawing graph of the lines of the form ax +by + c = 0.

Module 2 **(18 Hrs)**

Probability – Introduction – Sample spaces and events, Simple examples like tossing coin, tossing die etc.., Differential Calculus - Differentiation – Standard results (derivatives) without proof, Product rule, Quotient rule and function of function rule, Integral calculus (Integration simple cases, with and without limits)

Module 3 **(18 Hrs)**

HCF and LCM of numbers, Fractions, Squares and square roots, cube and cube roots, simplifications, Ratio and Proportion, Percentage, Profit and loss, Simple average (No Weighed average)

Module 4 **(18 Hrs)**

Simple interest, Compound interest, Time and work, Work and wages, Time and distance, Elementary mensuration – Area and perimeter of polygons

SEMESTER V

OPEN COURSE

MT5D01bB18-MATHEMATICAL MODELLING

Credits: 3

Total Lecture Hours : 72

Course Outcomes :

CO1 : Discuss basic principles of mathematical modelling.

CO2 : Discuss different types of models like Linear growth and decay models, Non-linear growth and decay models and Compartment models.

CO3 : Apply simulation using computers in Mathematical modelling.

CO4 : Explain Discrete System Simulation along with queuing simulation and simulation of time-sharing system.

Syllabus content :

Module1

Introduction: (18 Hrs)

Mathematical modelling-what and why? Classification of mathematical models, Characteristics of mathematical models, Mathematical modelling through geometry, algebra, trigonometry & calculus, Limitations of mathematical modelling.

Module 2 **(18 Hrs)**

Modelling Through First Order:

Linear growth and decay models, Non-linear growth and decay models, Compartment models, Modelling in dynamics and Modelling of geometrical problems.

Module 3 **(18 Hrs)**

System Simulation:

Introduction, Examples, Nature of simulation, Simulation of a chemical reactor, Euler and Runge-Kutta integration formulae, Simulation of a water reservoir system, Simulation of a servo system. (Write and execute all the computer programs throughout this course using C)

Module 4 **(18 Hrs)**

Discrete System Simulation:

Fixed time-step vs. event-to-event model, on simulating randomness, Monte-Carlo computation vs. stochastic simulation, Rudiments of queuing theory, Simulation of a single-server queue.

SEMESTER V

OPEN COURSE

MT5D01cB18 - FINANCIAL MATHEMATICS

Credits: 3

Total Lecture Hours: 72

Course Outcomes :

CO1 : Estimate the worth of a security by looking at the cash flows which helps to determine the rate of return to receive a break even on investment.

CO2 : calculate Capital Gains Tax.

CO3 : Analyze Capital Redemption Policies.

CO4 : compare the relationships between successive capital repayments.

Syllabus content :

Module 1 **(18Hrs)**

Theory of interest rates : Rate of interest – Accumulation factors – Force of interest and Stoodley's formula for the force of interest. Basic Compound interest relations: Relationships between s, i, v, and d – The equation of value and yield on a transaction.Annuity certain: Present values and accumulations – Loan schedule for a level annuity – Continuously payable annuities and varying (increasing and decreasing) annuities. Nominal rates of interest: Annuities payable p –thly- present values and accumulations- Loan schedule for p-thly annuities.

Module 2 **(18Hrs)**

Discounted cash flow: Net percent values and yields – The comparison two investment projects – The effects of inflation – The yield on a fund and

measurement of investment performance. Capital Redemption Policies: Premium calculations- Policy values, Surrnder values, paid-up policy values and policy alterations, Stood ley's logistic model for the force of interest, reinvestment rates.

Module 3 **(18Hrs)**

Valuation of securities: Fixed interest securities – Ordinary shares, prices and yields, perpetuities – Mak ham's formula, optional redemption dates – Effect of the term to redemption on the yield – Real returns and index linked stocks. Capital Gains Tax: Valuing a loan with allowance for capital gains tax - capital tax when the redemption price of the rate of tax is not constant - Finding the yield when there is capital gains tax

- optional redemption dates – Offsetting capital losses against capital gains.

Module 4 **(18Hrs)**

Cumulative Sinking Funds (Restricted coverage): The relationships between successive capital repayments – the term of the loan when the redemption price is constant.

FIFTH SEMESTER

MT5D01dB18-MATHEMATICAL ECONOMICS

Credits: 3

Total Lecture Hours : 72 (4 hours/week)

Course Outcomes :

CO1 : Analyze the demand and supply curve to determine the equilibrium price and equilibrium quantity of the market.

CO2 : Explain the relation between Marginal revenue , Average Revenue and Elasticity of demand.

CO3 : Administer the Law of diminishing marginal utility and the Law of equi-marginal utility.

CO4 : Employ partial derivatives to find optimal solutions to economic and business problems.

Syllabus content :

Module 1

Demand and Supply Analysis: (18Hrs)

Utility and demand – the meaning of demand and quantity demanded – the law of demand – demand curve – market demand curve – reasons for the law of demand – slope of a demand curve – shifts in demand – demand function and demand curve – the meaning of supply – supply function – law of supply – slope of a supply curve – shifts in supply – market equilibrium – price elasticity of demand – measurement of price elasticity – arc elasticity of demand – cross elasticity of demand.

Module 2 (18 Hrs)

Cost and Revenue Functions:

Cost function: Average and marginal costs, Short run and long run costs, Shapes of average cost curves in the short run and long run and its explanation, Revenue function, Marginal revenue (MR) and Average Revenue (AR) functions, Relation between MR, AR and Elasticity of demand.

Module 3 **(18 Hrs)**

Theory of Consumer Behaviour:

Cardinal utility analysis – the Law of diminishing marginal utility – the Law of equi- marginal utility – Indifference curves – Ordinal utility – Indifference map – Marginal rate of substitution – Properties of indifference curves.

Module 4 **(18 Hrs)**

Economic Applications of Derivatives:

Economic Applications of Derivatives. Marginal, average and total concepts optimizing economic functions - Functions of several variables and partial derivatives, Rules of partial differentiation, Second order partial derivatives, Optimization of multivariable functions, Constrained optimization with Lagrange multipliers, Significance of the Lagrange multiplier, Total and partial derivatives – total derivatives.

Marginal productivity, Income determination, multipliers and comparative statics, Income and cross elasticity of demand, Optimization of multivariable function in Economics constrained optimization of multivariable functions in Economics

SEMESTER VI

Course Code	Course Title	Credits	Course Type
MT6B09B18	REAL ANALYSIS –II	4	Core Course
MT6B10B18	COMPLEX ANALYSIS	4	Core Course
MT6B11B18	GRAPH THEORY & FUZZY MATHEMATICS	4	Core Course
MT6B12B18	LINEAR ALGEBRA	4	Core Course
MT6B13aB18	OPERATIONS RESEARCH	3	Choice Based Course
MT6B13bB18	INTEGRAL TRANSFORMS		
MT6BPRB18	PROJECT	2	Project

SEMESTER VI

CORE COURSE

MT6B09B18 - REAL ANALYSIS –II

Credits: 4

Total Lecture Hours: 108

Course Outcomes:

CO1 : Determine the nature of convergence of infinite series of positive real numbers using different tests .

CO2 : Explain the convergence and basic properties of alternating series of real numbers.

CO3 : Analyze the properties of real valued continuous functions.

CO4 : Explain the characteristics of Riemann integral of real bounded functions on intervals.

CO5 : Examine the Uniform convergence of sequence and series of real valued functions.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module 1 **(30 Hours)**

Infinite Series :A necessary condition for convergence. Cauchy`s general principle of convergence for a series. Positive term series. A necessary condition for convergence of positive term series. Geometric series. A comparison series $\sum \frac{1}{n^p}$, Comparison test for positive term series without proof. Cauchy`s root test D'Alembertès Ratio test, Raabe's test. Gauss`s test. Series with arbitrary terms. Alternating series. Absolute convergence

Module 2 **(25 Hours)**

Continuous functions

Continuous function (a quick review). Continuity at a point, continuity in an interval. Discontinuous functions. Theorems on continuity. Functions continuous on closed intervals. Uniform continuity.

Module 3 **(35 Hours)**

Riemann Integration

Definitions and existence of the integral. Inequalities of integrals. Refinement of partitions of integrability. Integrability of the sum of integrable functions. The integrals as the limit of a sum. Some applications. Some integrable functions. Integration and differentiation. The fundamental theorem of calculus.

Module 4 **(18 Hours)**

Uniform Convergence

Point wise convergence. Uniform convergence on an interval. Cauchy`s criterion for uniform convergence. A test for uniform convergence of sequences. Test for uniform convergence of series. Weierstrass`s M-test, Abel`s test. Statement of Dirichelet`s test without proof.

SEMESTER VI

CORE COURSE

MT6B10B18 - COMPLEX ANALYSIS

Duration: One Semester

Credits: 4 credits

Total Lecture Hours: 90

Course Outcomes:

CO1 : Analyze the properties of complex numbers and functions of complex variables.

CO2 : Analyze the differentiability of complex valued functions.

CO3 : Examine the characteristics of line integrals of functions of complex variables over curves.

CO4 : Examine the properties of series expansion of complex functions.

CO5: Compute definite and indefinite integrals.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content:

Module 1 **(30 hrs)**

Regions in the complex plane.Analytic functions, Functions of a complex variable – limits - theorems on limits - continuity – derivatives - differentiation formulas-Cauchy - Riemann equations - sufficient condition for differentiability - analytic functions examples - harmonic functions. Elementary functionsExponential function – logarithmic function – complex exponents – trigonometric functions - hyperbolic functions - inverse trigonometric and hyperbolic functions.

Module 2 **(25 hrs)**

Integrals : Derivatives of functions –definite integrals of functions –contours –contour integrals –some examples –upper bounds for moduli of contour integrals –ant derivatives –Cauchy-Goursat theorem (without proof)- simply and multiply connected domains- Cauchy's integral formula- an extension of Cauchy's integral formula- Liouville's theorem and fundamental theorem of algebra- maximum modulus principle.

Module 3 **(15 hrs)**

Series: Convergence of sequences and series -Taylor's series -proof of Taylor's theorem-examples-Laurent's series (without proof)-examples.

Module 4 **(20 hrs)**

Residues and poles Isolated singular points – residues – Cauchy's residue theorem – three types of isolated singular points - residues at poles - examples – evaluation of improper integrals – example – improper integrals from Fourier analysis – Jordan's lemma (statement only) – definite integrals involving sines and cosines.

SEMESTER VI

CORE COURSE

MT6B11B18- GRAPH THEORY AND FUZZY MATHEMATICS

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1 : Explain the basic definitions and concepts of graph theory.

CO2 : Explain the properties and characterisation of different types of graphs.

CO3 : Apply graph theory concepts to solve real world problems.

CO4 : Analyze the fundamental concepts of fuzzy sets.

CO5 : Explain basic operations of fuzzy sets.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I : **(25 Hrs)**

An introduction to graph. Definition of a Graph, Graphs as models, More definitions, Vertex Degrees, Sub graphs, Paths and cycles, The matrix representation of graphs (definition & example only)

Module 2 **(20 Hrs)**

Trees and connectivity. Definitions and Simple properties, Bridges, Spanning trees, Cut vertices and connectivity. Euler Tours and Hamiltonian Cycles .Euler's Tours, The Chinese postman problem.

Module 3: **(20 Hrs)**

Introduction, Crisp Sets: An Overview, Fuzzy Sets: Basic Types, Fuzzy Sets: Basic concepts. Additional properties of cuts, Representation of fuzzy sets

Module - 4

Operations on Fuzzy Sets: **(25Hrs)**

Types of Operations , Fuzzy complements , Fuzzy intersections: t – norms , Fuzzy Unions: t – conorms , Combinations of operations .

SEMESTER VI

CORE COURSE

MT6B12B18-LINEAR ALGEBRA

Credits: 4 credits

Total Lecture Hours: 90 (5 hours/week)

Course Outcomes:

CO1 : Analyze the basic concepts of vector spaces.

CO2 : Illustrate the fundamental properties of linear transformations.

CO3 : Compute the eigen values and eigen vectors of matrices.

CO4 : Illustrate the Diagonalization of a Matrix.

CO5 : Evaluate the Euclidean inner product of vectors.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module 1 **(30 hrs)**

Vector spaces: Vectors, Subspace, Linear Independence, Basis and Dimension, Row Space of a Matrix, Rank of a matrix (Theorem statements and problems only of 2.6) .

Module 2 **(35 hrs)**

Linear Transformations: Functions, Linear Transformations, Matrix Representations, Change of Basis, Properties of Linear Transformations.

Module 3 **(20 hrs)**

Eigen vectors and eigen values, properties of eigen values and vectors, Diagonalization of Matrix

Module 4 **(5 hrs)**

Euclidean Inner product-orthogonality

SEMESTER VI

CHOICE BASED COURSE

MT6B13aB18 - OPERATIONS RESEARCH

Credits: 4

Total Lecture Hours: 72

Course Outcomes:

CO1 : Develop mathematical models corresponding to real world problems.

CO2 : Explain the different techniques used for finding the solution of an LPP.

CO3 : Examine the relationship between primal and dual LP problems and their solutions.

CO4 : Explain the features of Transportation Problems and Assignment Problems and the different methods for solving them.

CO5 : Determine the best strategy and value of game for two person zero sum games using different techniques.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module I: Linear Programming: - Model formulation and solution by the Graphical Method and the Simplex method (20Hrs)

General Mathematical Model of LPP, Guidelines on linear Programming model formulation and examples of LP Model formulation. Introduction to graphical method, definitions, Graphical solution methods of LP Problems, Special cases in linear Programming, Introduction to simplex method, Standard form of an LPP, Simplex algorithm(Maximization case),Simplex algorithm(Minimization case),The Big M Method, Some complications and their resolution, Types of linear Programming solutions.

Module II: Duality in Linear Programming (12 Hrs)

Introduction, Formulation of Dual LPP, standard results on duality, Advantages of Duality, Theorems of duality with proof (theorems 5.1, 5.2, 5.3 only)

Module III: Transportation and Assignment Problems (22 Hrs)

Introduction, Mathematical model of Transportation Problem, The Transportation Algorithm, Methods for finding Initial solution, Test for optimality, Variations in Transportation Problem, Maximization Transportation problem, Introduction and mathematical models of Assignment problem, Solution methods of Assignment problem, variations of the assignment problem.

Module IV: Theory of Games (18 Hrs)

Introduction, Two-person zero sum games, pure strategic (Minimax and Maximin principles),Games with saddle point, mixed strategies, Games without saddle point, The rules of dominance, solution methods: Games without saddle point (Arithmetic method, Matrix method, Graphical method and Linear programming method)

SEMESTER VI

CHOICE BASED COURSE

MT6B13bB18 - INTEGRAL TRANSFORMS

Credits: 4 credits

Total Lecture Hours: 72

Course Outcomes:

CO1 : Determine the solutions of differential equations using Laplace transform.

CO2 : Compute Fourier series of periodic functions.

CO3 : Evaluate Fourier integrals and Fourier transforms of functions.

CO4 : Solve wave equations and heat equations using Fourier integrals and transforms.

Mapping of Course Outcomes with Program Specific Outcomes

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

Syllabus Content

Module 1 **(20 hrs)**

Laplace Transform, Inverse Transform, Linearity, Shifting, Transforms of Derivatives and Integrals, Differential Equations, Differentiation and Integration of Transforms, Convolution, Integral Equations, Partial Fractions, Systems of Differential Equations

Module 2 **(18 hrs)**

Fourier Series- Fourier Coefficients, Even and odd functions, half range Expansions

Module 3 **(14 hrs)**

Fourier Integrals and Transforms- Fourier integrals, Fourier cosine and sine transforms

Module 4 **(20 hrs)**

Modelling: vibrating string, wave equations, Separation of variables, use of Fourier series, D' Alembert's Solution of the wave equation, heat equation: solution by Fourier integrals and transforms.

SEMESTER VI

PROJECT

MT6BPRB18- Project

Credits: 2

Total Lecture Hours: 0

Course Outcomes:

CO1 : Employ the acquired analytical skill and proficiency to learn higher mathematics and do research in different areas of mathematics.

CO2 : Apply mathematical and statistical concepts to model and solve real life problems creatively through sustained critical investigation.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3
CO2	3	2	3	3	3