

MINUTES OF BOARD OF STUDIES IN MATHEMATICS

DATED: 26.06.2015

B.SC (MATHEMATICS)

CURRICULUM AND SYLLABUS

DEPARTMENT OF MATHEMATICS
SCSVMV UNIVERSITY

Sri ChandrasekharendraSaraswathiViswaMahavidyalaya (Deemed University)
B.Sc (Mathematics) Curriculum and Syllabus (Effective from 2015-2016)

Semester	Paper	Sub Code	Internal Marks	External Marks	Total Marks	Credits
I	Language I	LT101/LH101/LS101	40	60	100	3
	English I	LE102	40	60	100	3
	Analytical geometry and Trigonometry	UM103	40	60	100	4
	Calculus	UM104	40	60	100	4
	Principles of Environmental Science	UM105	40	60	100	4
	Allied Statistics I	UM106	40	60	100	4
	Lab – Basics of MatLab*		-	-	-	-
	Sanskrit and Indian culture I	IC107	100	-	100	1
Semester Credits : 23						
II	Language II	LT201/LH201/LS201	40	60	100	3
	English II	LE202	40	60	100	3
	Classical Algebra	UM203	40	60	100	4
	Vector Calculus and Fourier Series	UM204	40	60	100	4
	Allied Statistics II	UM205	40	60	100	4
	Lab – Basics of Matlab	UM206	40	60	100	5(3)
	Sanskrit and Indian culture II	IC207	100	-	100	1
Semester Credits : 24(22 only)						
III	Language III	LT301/LH301/LS301	40	60	100	3
	English III	LE302	40	60	100	3
	Differential Equations and Applications	UM303	40	60	100	4
	Numerical Methods	UM304	40	60	100	4
	Allied Physics I	UM305	30	45	75	4
	Allied Physics Practical*		-	-	-	-
	Quantitative Aptitude	QA307	100	-	100	1
Semester Credits : 19						
IV	Language IV	LT401/LH401/LS401	40	60	100	3
	English IV	LE402	40	60	100	3
	P.D.E and Transform Techniques	UM403	50	-	50	4
	Graph Theory	UM404	40	60	100	4
	Allied Physics II	UM405	30	45	75	4
	Allied Physics Practical	UM406	20	30	50	4(3)
	Logic and Verbal Reasoning	LR408	100	-	100	1
Semester Credits : 23(22)						
	Statics	UM501	40	60	100	4
	Sequences and Series	UM502	40	60	100	4

V	Complex Analysis	UM503	40	60	100	4
	Abstract Algebra	UM504	40	60	100	4
	Programming in C	UM505	40	60	100	4
	Programming in C Lab*		-	-	-	-
	Communicative Skill course	DI507	100	-	100	1
Semester Credits : 21						
VI	Dynamics	UM601	40	60	100	4
	Real Analysis	UM602	40	60	100	4
	Linear Algebra	UM603	40	60	100	4
	Operations Research	UM604	40	60	100	4
	Discrete Mathematics & Automata Theory	UM605	40	60	100	4
	Programming in C Lab	UM606	40	60	100	5(3)
	Personality Development course	PD607	100	-	100	1
Semester Credits : 26(24)						
Total Credits : 131						

SEMESTER I

5. Visit of Pagodas
6. Tolerance

Unit III: Vocabulary

Unit IV: Basic Grammar

1. Articles
2. Pronouns –Personal & Impersonal
3. Adjectives
4. Synonyms & Antonyms
5. Sentence Structure

Unit V: Communication through Grammar

6. Tense forms
7. Idioms & Phrases
8. Suitability & Verbs
9. E-Mail
10. Patterns of Greeting

Book prescribed:

1. *At Home with English* (An Anthology of Modern English Prose for Developing Communication Skills) Ed. T.M. Farhathullah. Lessons 7 to 12 (Allied Publishers, Chennai)

UNIT-I

Polar equations- Straight lines-Circles- Conics- Tangent-Normal

UNIT-II

Rectangular Cartesian coordinates-Direction cosines of a line – The plane

Unit-III

The straight line – Plane and straight line- Coplanar lines

Unit- IV

Sphere – Cone- Cylinder

UNIT-V

Expansions- Hyperbolic functions- Logarithm of complex numbers

Recommended Text

T.K.Manickavachagom Pillay & others. (2004) *Analytical Geometry* (Two & Three Dimensions)
S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

S.Narayanan, Trigonometry

Reference Books

1. P.Duraipandian and LaxmiDuraipandian *Analytical Geometry-2D*, Asia Publishing company, Bombay
2. P.Duraipandian and LaxmiDuriapandian *Analytical Geometry-3 D*, Emerald Publishers, Chennai.
3. G.B.Thomas and R.L.Finney. *Calculus and Analytic Geometry*, Addison Wesley , Mass. (Indian Print).
4. P.R.Vittal *Coordinate Geometry*. Margham Publishers, Chennai

CALCULUS

L	P	T	C
4	0	1	4

UNIT-I

Partial differentiations. Total differentials; Jacobians; Maxima and Minima of functions of 2 and 3 independent variables - necessary and sufficient conditions (without proof); Lagrange's method (without proof) - simple problems on these concepts.

UNIT-II

Envelopes-Curvature-Circle, radius and centre of curvature – Cartesian formula for the radius of curvature- The coordinates of the centre of curvature

UNIT-III

Evolutes and involutes- radius of curvature in polar coordinates- p-r equation- Pedal equation of curve-chord of curvature

UNIT-IV

Linear asymptotes – Singular points- Tracing of curves

Unit-V

Reduction formulae- Bernoulli's formula

TEXT BOOKS:

1. Calculus volume-1 by T.K. ManikavasagamPilly, S.Viswanathan (Printers and Publishers Pvt Ltd) 2010 print
2. Calculus Volume-II by T.K. ManikavasagamPilly, S.Viswanathan(Printers and Publishers Pvt Ltd) 2010 print
Unit-I ; Volume I
Unit-II: Volume I: Chapter X; Section 1, Section 2-2.1 to 2.4
Unit-III : Volume I : Chapter X; Section 2.5-3.1
Unit-IV: Volume I Chapter XI, XII and XIII
Unit- V: Volume II; Chapter1; Sections 13-15.1

Unit - 1 : Introduction to environment and environmental studies

1.1. Introduction to environment – components – nature of environment - need of awareness – water crisis - climatic change - fossil fuels– pollution – loss of biodiversity – deforestation – their impacts - reasons for environmental problems – anthropocentric and eco centric views.

1.2. Environmental studies - multidisciplinary nature – scope and aim – sustainable development-principles – RRR concept- extension – response of world community – Indian environmental movements – environmental calendar.

Unit – 2 : Ecosystem and Biodiversity

2.1. Ecosystem – structure – functions – simplified ecosystem models (food chain and food webs and their types) - forest – grassland – pond – desert- estuary ecosystems – ecological succession - ecological pyramids – Bio-geochemical cycles of water – oxygen-carbon-phosphorous and sulphur.

2.2 Biodiversity – definition – types – species – genetic and ecosystem diversities- values of biodiversity – threats to biodiversity – conservation of biodiversity – endemism – biodiversity hotspots – Indian biodiversity – soils of India – floristic regions – endemic species of India – IUCN lists -red-green and blue data books.

Unit – 3 : Natural resources

3.1 Natural resources – definition – types – forest resources – uses –deforestation- reasons - effects – water resources – distribution of water in the globe – other reasons for problems – conservation of water – dams – effects of dams - food resources – modern agriculture– ill effects -energy resources- types – hydel –nuclear – solar –wind and biomass energy - world scenario – Indian scenario

3.2 Population and environment – reasons for over exploitation of resources – population – demography – population curves – population explosion – effects – consumerism – effects – urbanization – reasons and effects- role of an individual.

Unit – 4 : Environmental Pollution

4.1 Pollution – definition – types – air pollution – causes and effects – effects of CO₂ – CO – NO_x –SO_x – particulates – control of air pollution – water pollution – causes – effects – remedies – soil pollution – solid waste management – e waste – ill effects of e-waste – proper recycling- Noise pollution – reasons – effects – control – nuclear pollution – cases – effects and control – marine and thermal pollution causes – effects and remedies

4.2 Legal provisions for protecting environment – article 48 A – 51 A (g) – Environment act 1986 – Air act 1981 – Water act 1974 – wild life protection act – Forest act 1980- salient features and inadequacies - problems in implementation – reasons

Unit – 5 : Social issues and environmental ethics

5.1 Present environmental scenario – green house effect – climate change – The Kyoto Protocol – ozone layer depletion-The Montreal Protocol - acid rain – causes – effects - disparity among the nations – The Copenhagen UNFCCC summit – carbon currency- virtual water- genetically modified organisms.

5.2 Environmental ethics – introduction – people getting affected - resettlement and rehabilitation – issues involved — SardharSarovar project – TawaMatsya sang - Melting icebergs of Arctic.

Text Book

1. Perspectives in Environmental studies – Anubhakaushik and CP kaushik, New age international publishers, 4th edition, 2014.

Reference books

1. Environmental Studies, N. Nandini, N. Sunitha and SucharitaTandon,Sapna Book House, 2007.
2. Text book of Environmental Science, RagavanNambiar, Scitech Publications, 2009.
3. Text book of Environmental Chemistry and Pollution Control, S.S.Dara, S.Chand and Co., 2002.
4. Environmental Chemistry, Colin Baird, W.H.Freeman and company, New York,1999.
5. Environmental Chemistry, Gary W. VanLoon and Stephen J.Duffy, Oxford University Press, 2000.
6. New Trends in Green Chemistry, V.K. Ahluwalia and M. Kidwai, Anamaya Publishers, 2006.

Unit I Theory of Probability

Introduction-Definition of various terms – Axiomatic approach to Probability – Probability –Conditional Probability- Laws of addition and Multiplication – Bayes Theorem

Unit II Random variables and Distribution Functions

Random variable – Distribution – Discrete Random Variable – Continuous Random Variable

Unit III Mathematical Expectation and Generating Functions

Mathematical Expectation – Addition Theorem of Expectation – Multiplication Theorem of Expectation – Covariance – Expectation of Linear Combination of Random Variables – Variance of Linear Combination of Random variables – Moment Generating Function

Unit IV Theoretical Discrete Distributions

Binomial Distribution – Poisson Distribution-Geometric distribution-moments.

Unit V Theoretical Continuous Distributions

Normal Distribution - Exponential distribution-moments.

Prescribed Text Book:

Veerarajan. T.,” Probability, Statistics and Random Processes, Third Edition, Tata McGraw-Hill Publishers, New Delhi 2008

Reference Books:

Elements of mathematical statistics by S.C. Gupta and V.K.Kapoor by Sultan Chand & sons, third edition.

Gupta S.P, Statistical methods, Sultan Chand & Sons

Sheldon Ross, First Course in Probability , Pearson Publications

Lab – Basics of MatLab*

Unit-I

Getting started with MATLAB- Getting acquainted with MATLAB windows- Command window- Editor window- Figure window- Help window- Command history window-Current directory window- Workspace window- Common mathematical operators- Some commonly used mathematical functions-

Unit-II

Creating a matrix and array- Matrix algebra-Transpose-inverse-rank-Accessing elements of a matrix(array)- length and size of a matrix- The maximum , minimum and mean of matrix(array) etc., - Direct Concatenation method- reshape function-flipping-Creating special matrices – Solution of system of simultaneous equations.

Unit-III

The plot functions--Histogram plotting-pie graph plotting

Unit-IV

The plot functions-2-D plotting- adding titles-labels –legends-polar plotting- 3-D plotting-surface plotting

Reference Books:

Getting Started with Matlab by RudraPratap, Oxford University Press

Engineering Problem solving with Matlab, D.M.Etter, Printice-Hall

A Matlab Primer, Kermit Sigmon ,

MATLAB Demystified, Basic Concepts and Applications, K KSarma, Vikas Publishing House Pvt Ltd

Applied Numerical Methods with MATLAB by Steven C. Chapra, 3rd Edition, McGrawHill (pdf is available)

Numerical Analysis using Matlab and Spread sheets by Steven T. Karris, 2nd edition, Orchard Publications

An Introduction to Matlab, by David F. Griffiths, Department of Mathematics , University of Dundee

SEMESTER II

Unit I: Essays

1. Computers
2. Voter
3. The World of Albert Einstein

Unit II: Essays

1. The Cop and the Anthem
2. The Photographer
3. What Can One Do?

Unit III: Vocabulary

Unit IV: Grammar I

1. Relative pronouns
2. Adverbs
3. Prepositions
4. Phrasal verbs
5. Idioms

Unit V: Grammar II

1. Active Voice & Passive Voice
2. Infinitives & Gerunds
3. Conditionals
4. Collocations
5. American and British words

Book prescribed: *At Home with English* (An Anthology of Modern English Prose for Developing Communication Skills) Ed. T.M. Farhathullah. Lessons 7 to 12 (Allied Publishers, Chennai)

Unit-I

Vandermonde's theorem- Binomial theorem for rational index- Particular cases of the Binomial expansion- Sign of terms in the Binomial expansion- Application of the Binomial theorem to the summation of series- Sum of the coefficients – Approximate values-Exponential series-Summation- The logarithmic series

Unit-II

Theory of equations- Remainder theorem-Every n^{th} degree equation has exactly n roots and no more-Relation between roots and coefficients of equations- symmetric function of the roots-Sum of powers of roots of an equation- Newton's theorem on sum of powers of the roots

Unit-III

Transformation of equations-Reciprocal equations- Reciprocal roots-Removal of terms-Transformation in general- Descarte's Rule of sings- Rolle's theorem and its applications- Multiple roots

Unit-IV

Strum's theorem-Solution of numerical equations-Horner's method (upto 2 decimals)

Unit-V

General solution of the cubic equations- Cardon's method- Solution of biquadratic equations- Ferrari's method

Text Book

A Text Book of Algebra by T.K. Manickavasagam Pillai

UNIT-I

Double Integrals in polar and Cartesian coordinates- change of order of integration- polar and Cartesian coordinates- triple integrals- Beta and Gamma functions- properties- simple problems

UNIT-II

Vector differentiation- Gradient- Divergence- Curl

UNIT-III

Vector integration – Line integral- Surface integral- Volume integral

UNIT-IV

Green's theorem- Stoke's theorem- and Gauss divergence theorem (without proofs) and simple applications

UNIT-V

Fourier series- The Cosine and Sine series- Even and Odd functions- Half range series

Recommended Text

B.S.Grewal. *Higher Engineering Mathematics* (2002), Khanna Publishers, New Delhi.

Reference Books

1. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9th Edn), Mass. (Indian Print).
2. M.K.Venkataraman. (1992) *Engineering Mathematics-Part B*. National Publishing Company, Chennai.
3. P.R.Vittal. (2004) *Vector Calculus, Fourier series and Fourier Transform*. Margham Publications, Chennai.

Unit I

Correlation- scatter diagram- Karl Pearson coefficient of correlation- Calculation of the correlation coefficient for a bivariate frequency distribution- Rank correlation

Unit II

Regression- Lines of regression – Regression coefficients- properties of regression coefficients- Angle between two lines of regression.

Unit III

Theory of Attributes- Introduction – Notations – Dichotomy- classes and class frequencies – Order of classes and class frequencies- Class symbol as operators – Consistency of data- Independence of attributes- Association of attributes.

Unit IV

Test of significance- Null hypothesis- Errors in sampling- Critical region and level of significance- Tests of significance for large and small samples - Standard error – Test of significance for single mean, difference of mean and difference of standard deviations.

Unit V

Exact sampling distributions- Chi- square variate- Derivation of the chi- square distribution M.G.F. of χ^2 - distribution- Chi-square test for independence of attributes and goodness of fit.

Text book

Elements of mathematical statistics by S.C. Gupta and V.K.Kapoor by Sultan Chand & sons, third edition.

SEMESTER III

UNIT II: Short Stories:

1. Am I Blue? – Alice Walker.
2. The Last Leaf – O. Henry
3. The Selfish Giant – Oscar Wilde

UNIT III: One Act Play

1. Soul Gone Home – Langston Hughes

UNIT IV: Words Study

1. Vocabulary
2. Spelling

UNIT V: Modes of Communication

1. Writing
2. Degrees of Comparison
3. Factual Writing

All these to be taught from exercises given after the end of each lesson

Book Prescribed:

Radiance – Emerald Publishers, Casa Major Road, Egmore, Chennai-600008.

Unit I

Differential equation of first order –Equation of the first order and first degree, Homogeneous equations, exact differential equations- Integrating factors- linear equations- Bernoulli's equation- equation solvable for p , y and x - Clairaut's equation.

Unit II

Linear equation of second order with constant coefficients - Methods of finding complementary functions – Methods of finding particular integrals. Homogeneous linear equations – Euler – Cauchy equations - Linear equations with variable coefficients

Unit III

Method of variation of parameters- Simultaneous linear differential equations.

Unit IV

Applications of differential equations- Orthogonal trajectories- Growth and decay- Continuous compound interest- The Brachistochrone problem- Tautochronous property of the cycloid- Simple electric circuits- Falling bodies- simple harmonic motion – Simple pendulum-

Unit V

Differential equations- Formation of partial differential equations- Methods of solving first order partial differential equations- Some standard forms- Charpit's method.

Recommended Texts

1. B.S.Grewal Higher Engineering Mathematics, Khanna Publishers, New Delhi.
2. SheplyL.Ross, Differential Equations, III Edition John Wiley & Sons, New York.

Reference Books

1. M.D. Raisinghania, Ordinary and Partial Differential Equations, S.Chand and Co., New Delhi.
2. M.R.Spiegel ,Advanced mathematics for Engineers and Scientists, Tata McGraw Hill Edition, New Delhi.

Unit I

Solution of equations

Solution of algebraic and transcendental equations - Bisection method – Method of false position (Regula-Falsi Method) - Newton-Raphson Iterative method - Solution of linear simultaneous equations - Direct methods of solution: Gauss elimination method , Gauss – Jordan method – Iterative methods of solution : Jacobi’s method , Gauss – Seidel method

Unit II

Finite differences

Introduction – First differences – Higher Differences – Difference Tables- Backward Differences- Central Difference Notation – Properties of the operator Δ - Differences of a polynomial – Factorial Polynomials – Simple Problems – Error Propagation in a difference table – Operators E, ∇, δ, μ – Basic Properties.

Unit III

Interpolation

Introduction- Linear Interpolation- Gregory Newton’s forward interpolation formula – Newton’s backward interpolation formula – equidistant terms with one or more missing values – error in polynomial interpolation- error in Newton’s interpolation formulae

Central difference interpolation formulae:

Central difference tables- Central difference interpolation formulae- Gauss’s Forward and Backward Interpolation Formulae – Stirling’s Formula- Bessel’s Formula – Laplace – Everett Formula- Simple Problems.

Unit IV

Interpolation with Unequal Intervals

Divided difference – properties of divided differences – Newton’s Interpolation formula for unequal intervals- Lagrange’s interpolation formula- Inverse Interpolation – simple problems.

Unit V

Numerical differentiation: Introduction - Newton’s Forward and Backward difference formula to compute the derivatives upto second order – Derivatives using Strilings formula- Maxima and Minima of a tabulated function

Numerical Integration: TheTrapezoidal rule -Simpson’s one-third rule - Simpson’s three-eighth rule – Truncation error in Simpson’s formula.

Recommended Text

M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

Reference Books

1. S. Arumugham. (2003) *Numerical Methods*, New Gamma Publishing, Palamkottai.
2. H.C. Saxena. (1991) *Finite differences and Numerical analysis* S.Chand& Co., Delhi
3. A.Singaravelu (2004). *Numerical Methods* Meenakshi Agency, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) *Calculus of Finite difference & Numerical Analysis*, S.Chand& Company Ltd., New Delhi-55.

Objective:

- *The basic concepts of simple harmonic motion, waves and oscillations- their behavior and moment of Inertia.*
- *To makes student understand gravitational laws and gravitational constant and the properties and behavior of elastic materials.*
- *To create the awareness about basic properties of sound waves and their properties and also it enhances the knowledge about ultrasonics and optical properties and their experimental evidences.*
- *To make the students to get feel of understanding the building blocks of modern electronics science.*

UNIT – I: Mechanics

(12 hrs)

Simple harmonic motion, phase-equations of wave motion-compound pendulum- center of suspension-interchangeability center of oscillation and suspension- Moment of Inertia –Radius of gyration – Angular Momentum – torque – Theorems of M.I - M.I. of uniform rod, disc, circular ring, solid sphere –Kinetic energy of rotating energy- Acceleration of a body rolling down on an inclined plane.

UNIT – II: Gravitation and Elasticity

(12 hrs)

Law of gravitation–constant G - Kepler’s laws-relation between G and g – earth’s mass and density - variation of the acceleration due to gravity - orbital velocity - escape velocity - types of moduli - Poission’s ratio relation between ν , n & k – bending of beams - bending moment – cantilever cantilever loaded at one end-supported at two ends and loaded in the middle.

UNIT – III: Sound

(12 hrs)

Transverse waves – velocity along a stretched string-laws of transverse vibration of strings-verification of laws-Melde’s experiment-ultrasonics-generation - piezo-electric effect- -detection of ultrasonics-applications-determination of velocity of sound in a liquid

UNIT – IV: Optics

(12 hrs)

Defects in images -chromatic aberration-spherical aberration- Determination of refractive index using spectrometer -Newton’s rings-determination of wavelength and refractive index of liquid-plane transmission grating-resolving power of diffraction grating-determination of wavelength- Nicol prism – double refraction

UNIT – V: Basic Electronics

(12 hrs)

semi conductors - intrinsic and extrinsic types -p-n junction-forward bias, reverse bias- characteristics - full wave rectifier, zener diode, tunnel diode, photo diode, LED -transistor-CE and CB characteristics-transistor amplifier.

Text Books:

1. Modern physics by R Murugesan&Kiruthiga, Sivaprasath S Chand & Co. 15th edition, (2006)
2. A Text Book of Sound by N. Subramaniam and Brijlal, S. Chand & Co., 2nd revised edition (1995).
3. A textbook of Optics by Subramaniam N, M.N. Avadhanulu, S.Chand, Publishing, 25th edition, (2012)
4. Principles of Electronics V.K.Mehta, Rohit Mehta, S.Chand, 10th edition, (2006).
5. A text book of applied Electronics R.S. Sedha., S.Chand, multicolour revised edition, 2006.

Reference Books:

1. Introduction to Modern Physics by Rich Meyer, Kennard, Coop Tata McGraw Hill Publishing Co. 6th edition.(2009)
2. A Text Book of Sound R. L. Saighal, S. Chand & Co., (2005)
3. Optics and Spectroscopy by Murugesan, S Chand & Co. Pvt. Ltd., New Delhi.(2010)
4. Foundations of Electronics : Chattopadhyay, D.,Raxshit, P.C. Sara, B and Purkait New Age International (P) Limited.(2015)

SEMESTER IV

ENGLISH-IV

L	P	T	C
3	0	1	3

Unit-1: Letter Writing

Unit II: Comprehension

Unit III: Report Writing

Unit IV: Dialogue Writing

Unit V: Group Discussion

Book Prescribed:

Radiance – Emerald Publishers, Casa Major Road, Egmore, Chennai-600008. (Relevant Exercises at the end of all lessons including prose from *Radiance*)

PARTIAL DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES

Unit I	L	P	T	C
	4	0	1	4

Homogeneous linear partial differential equations with constant coefficients – Methods of finding C.F. – Methods of finding P.I.

Unit II

Application of partial differential equations- Method of separation of variables – Vibration of a stretched string: Wave equation- solution of wave equation-D'Alembert's solution of wave equation – One dimensional heat flow – Solution of heat equation

Unit III

Laplace transform – standard forms – linear property – first shifting theorem – multiplication by t^n – Division by t – Laplace transform of derivatives and integrals

Inverse Laplace transform(usual types)- applications of Laplace transform to solution of first and second order linear differential equations(constant coefficient)

Unit IV

Fourier transform

Infinite Fourier transform (complex form, no derivation)- sine and cosine transforms- simple properties of fourier transforms – convolution theorem- parseval's identity.

Unit V

Z – Transforms

Standard z-transforms of $1, a^n, n^p$ – Linearity property – Damping rule – Shifting rules – Multiplication by n - Initial and final value theorems (without proof) – inverse z –transforms – Convolution theorem (without proof) – Convergence of z-transforms – Evaluation of inverse z-transforms: Power series method, Partial fraction method, inversion integral method

Recommended Texts

B.S.Grewal Higher Engineering Mathematics, Khanna Publishers, New Delhi.

Reference Books

1. M.K.Venkataraman. *Engineering Mathematics-Part B*. National Publishing Company, Chennai.

GRAPH THEORY

L	P	T	C
4	0	1	4

Unit I

Graphs and Subgraphs – Introduction – Definition and Examples – Degree of a vertex – subgraphs – isomorphism of Graphs – Ramsey Numbers – Independent sets and Coverings

Unit-II

Intersection Graphs and Line Graphs – Adjacency and Incidence Matrices – Operations on Graphs – Degree Sequences – Graphic Sequences

Unit III

Connectedness -Introduction – Walks, Trails, paths, components, bridge, block - Connectivity

Unit IV

Eulerian Graphs – Hamiltonian Graphs

Unit V

Trees – Characterization of Trees – Centre of a Tree – Planarity – Introduction, Definition and Properties – Characterization of Planar Graphs – Thickness – Crossing and Outer Planarity

Recommended Text

S.Arumugam and S.Ramachandran, “Invitation to Graph Theory”, SITECH Publications India Pvt. Ltd., 7/3C, Madley Road, T.Nagar, Chennai - 17

Reference Books

1. S.Kumaravelu, SusheelaKumaravelu, Graph Theory, Publishers, 182, Chidambara Nagar, Nagercoil-629 002.
2. S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd.
3. Robin J.Wilson, Introduction to Graph Theory, Longman Group Ltd.
4. J.A.Bondy and U.S.R. Murthy, Graph Theory with Applications, Macmillon, London.

ALLIED PHYSICS –II

L	P	T	C
4	0	1	4

Objective:

- To makes the student aware about the modern wave mechanics which are basic for the modern physics by explaining the quantum view of physics.
- Explains the basics concepts and properties of nucleus and about the various particle accelerators.
- To make students to understand the modern lasers, modern electronics and digitization of computers.

UNIT- I Modern physics:

(12 hrs)

Einstein's photo electric equation – verification of Einstein's photo electric equation by Millikan's experiment – photo electric cells – applications

Wave mechanics: De Broglie concept of matter waves – characteristics and calculation of De Broglie wave length -Study of De Broglie matter wave by G.P.Thomson experiment.

UNIT- II Nuclear physics:

(12 hrs)

Nuclear forces –characteristics - nuclear structure by liquid drop model – Binding energy – mass defect – particle accelerators – cyclotron and betatron – nuclear Fission and nuclear Fusion – introduction to elementary particles – Leptons, Mesons and Baryons

UNIT III Laser physics:

(12 hrs)

Principles of laser– population inversion – meta stable state – conditions for laser actions - Types –Nd-Yag – Helium – neon laser – applications of lasers – Raman effect – Raman shift – stokes and anti stokes lines

UNIT IV Semiconductor physics:

(12 hrs)

Volt – Ampere Characteristics of P-N junction Diode – Zener diode – applications of Zener diodes - Volt – Ampere Characteristics of FET, UJT and SCR – Principles of LED and LCD – Frequency Modulation and Amplitude modulation –principles and applications of RADAR.

UNIT V Digital Electronics:

(12 hrs)

Number systems – conversion of binary into decimal – conversion of decimal to binary – binary addition and subtraction – Basic logic gates – NAND and NOR as an universal logic gates – Demorgan's theorems – Boolean algebra – applications of Demorgans theorems – Half adder and full adder circuits.

Text Books

1. Modern physics by R Murugesan S Chand & Co. (1984)
2. Nuclear Physics D G Tayal - Himalayan Publishing House (2008)
3. Elements of Nuclear Physics - M L Pandya & R P S Yadav, 7th edition, Kedasnath Ram nath publisher (2013).
4. Principles of Electronics V.K.Mehta. (1980)
5. A text book of applied Electronics R.S. Sedha. (2008)

Reference Books

1. Introduction to Modern Physics by Rich Meyer, Kennard, Coop Tata McGraw Hill Publishing Co. (1969)
2. Nuclear Physics S N Ghoshal - S Chand & Co. Edition , 1st edition, (1994).
3. Nuclear Physics - Irving Keplan, 2nd edition, Addison Wesley publishing company, (1955).
4. Foundations of Electronics : Chattopadhyay, D.,Raxshit, P.C. Sara, B and Purkait New Age International (P) Limited, 3rd edition, (2015)

Allied Physics Practical

(ANY 10 EXPERIMENTS ONLY)

1. Acceleration due to gravity-Compound pendulum method
2. Moment of inertia – Torsional pendulum method
3. Young’s modulus - Uniform bending - Optic lever method
4. Young’s modulus - Non-uniform bending - Pin and microscope
5. Rigidity modulus – Static torsion method.
6. Frequency of A.C - Sonometer
7. Thermal conductivity - Lee’s disc method.
8. Refractive index of a solid prism - Spectrometer
9. Refractive index of a liquid prism – Spectrometer
10. (i-d) curve - solid prism - Spectrometer
11. Wavelengths of spectral lines – Grating - Normal incidence - Spectrometer
12. Wavelength of spectral lines – Grating - Minimum deviation - Spectrometer
13. Radius of curvature of lens - Newton’s rings method.
14. Viscosity of highly viscous liquid - Stoke’s method.
15. Surface tension - Drop weight method
16. Characteristics of Pn Junction diode
17. Characteristics of Zener diode
18. Verification of truth tables of logic gates.

Reference:

Engineering Physics Lab Manual – By Dr. K. Venkatramanan et al., SCSVMV

SEMESTER V

STATICS

L	P	T	C
4	0	1	4

Unit I

Types of forces – magnitude and direction of the resultant of the forces acting on a particle - Forces acting at a point – Lami’s theorem, equilibrium of a particle under several coplanar forces.

Unit II

Parallel forces- moments - couples

Unit III

Equilibrium of three forces acting on a rigid body- Coplanar forces acting on a rigid body.

Unit IV

Friction

Laws of friction- angle of friction-equilibrium of a body

Limiting friction

Unit V

Center of gravity of simple uniform bodies – triangular lamina- rod forming a triangular- trapezium- center of gravity of circular arc- elliptic quadrant- solid hemisphere, cone-hollow hemisphere and cone

Equilibrium of strings – catenary.

Recommended Text

M.K. Venkataraman (1990) *Statics*. A Rajhans Publications. (16th Edn), Meerut.

Reference Books

1. S. Narayanan, R. Hanumantha Rao, K. Sitaraman, P. Kandaswamy, *Statics*, S. Chand and Company Ltd, New Delhi.
2. S. L. Loney, *An Elementary Treatise on Statics*, Cambridge University Press, 1951
3. A.V. Dharmapadam(1991) *Mechanics*. S. Viswanathan Printers & Publishers. Chennai.
4. Joseph F. Shelley (2005) *Vector Mechanics for Engineers Vol-I: Statics*, Tata McGraw Hill Edition, New Delhi.

SEQUENCES AND SERIES

L	P	T	C
4	0	1	4

Unit I

Sets and elements-Operations on sets- functions-Real-valued functions-Equivalence, count ability- Real numbers- Least upper bounds

Unit II

Definition of sequence and subsequence- Limit of sequence- Convergent sequences- Divergent sequences- Bounded sequences-Monotonic sequences- Operations on convergent sequences- Operations of divergent sequences

Unit III

Limit superior and limit inferior- Cauchy's sequences- summability of sequences

Unit IV

Series of real numbers- Convergence and divergence-series of nonnegative terms- Alternating series- Conditional convergence and absolute convergence- Rearrangement of series- Test for absolute convergence

Unit V

Series whose terms form a non increasing sequence- summation by parts- (C,1) summability of series- The class l^2

Recommended Text

Methods of real analysis- Richard R. Goldberg(oxford and IBH Publishing Co)

Reference Books

1. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9th Edn), Mass. (Indian Print).
2. M.K.Venkataraman. (1992) *Engineering Mathematics-Part B*. National Publishing Company, Chennai.

Unit I

Complex numbers: Point at infinity, stereographic projection

Analytic function

Functions of complex variable, mappings, Limits, theorems of limits without proof, continuity of a complex function - Derivative of a complex function, differentiation formula, Cauchy-Riemann equations, sufficient conditions Cauchy – Riemann equations in polar form, Analytic functions – Harmonic functions Orthogonal system

Unit II

Mapping by elementary functions

Linear functions, the function $\frac{1}{z}$, linear fractional transformations, the functions $w = z^n$, $w = e^z$, special linear fractional transformations.

Unit III

Integration of complex functions

Definite integrals, contours, line integrals, Cauchy- Goursat theorem(without proof) – Cauchy’s integral formula – derivatives of analytic functions, maximum moduli of functions.

Unit IV

Series: Convergence of sequences and series (theorems without proof) Taylor’s series, Laurent’s series – Zeros of analytic functions.

Unit V

Residues and poles

Residues – Residue theorem, the principal part of functions, poles, evaluation of improper real integrals, improper integrals, integrals involving trigonometric functions, definite integrals of trigonometric functions.

Recommended Text

Dr.S.Arumugam, “complex analysis”, scitech Publications, Pvt Ltd. chennai.2003.

Reference Books

1. R.V.Churchill and J.W.Brown, (1984) *Complex Variables and Applications*. McGraw Hill International Book Co., Singapore. (Third Edition)
2. P. Duraipandian and LaxmiDuraipandian (1976) *Complex Analysis*: Emerald Publishers, Chennai
3. S. Ponnusamy. (2000) *Foundations of Complex Analysis*, Narosa Publishing House, New Delhi
4. Murray R. Spiegel. (2005) *Theory and Problems of Complex Variable*. Tata-Mcgraw Hill Edition, New Delhi.

Abstract algebra

L	P	T	C
4	0	1	4

Unit I

Definition of groups- examples- elementary properties- equivalent definitions- cyclic groups- order of an element.

Unit II

Subgroups - Cosets and Lagrange's theorem- normal subgroups – quotient groups- homomorphism.

Unit III

Isomorphism-automorphism- Cayley's theorem- permutations – transpositions, cycles – odd and even permutations - permutation groups – symmetric group S_n

Unit IV

Rings- definition and examples- elementary properties of rings- characteristic of a ring – integral domain - Homomorphism of a rings

Unit V

subrings- ideals and quotient rings- prime ideal – maximal ideal- field of quotients of an integral domain- ordered integral domain- field-Definition and examples.

Recommended Text

I.N.Herstein. Topics in Algebra, (2nd Edn.) Wiley Eastern Ltd. New Delhi

Reference Books

1. S.Arumugam. *Modern Algebra*. Scitech Publications, Chennai.
2. J.B.Fraleigh *A First Course in Algebra* (3rd Edition) Addison Wesley, Mass. (Indian Print)
3. Lloyd R.Jaisingh and Frank Ayres,Jr. *Abstract Algebra*, (2nd Edition), Tata McGraw Hill Edition, New Delhi.
4. M.L.Santiago *Modern Algebra*, Tata McGraw Hill, New Delhi.
5. Surjeet Singh and QaziZameeruddin. *Modern Algebra*. Vikas Publishing House Pvt. Ltd. New Delhi.

PROGRAMMING IN C

L	P	T	C
4	0	1	4

Unit I

C Constants, variables, Data-type, Declaration of variables, assigning values to variables.

Unit II

Operators Arithmetic, Relational, Logical, Assignment, Increment and decrement, Conditional, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic operators, Formatted input and output.

Unit III

Operators and Arrays Decision making and branching If, simple if, If else, Nesting of if - else, Else - If ladder, Switch statement, the?: operator, Go to statement. Decision making with looping: While, Do, For statement, Jumps in loops. Arrays: 1 - dimensional array, 2 - dimensional array, Initializing 2 - dimensional array, Multi - dimensional arrays.

Unit IV

User-Defined Function Need for User-defined function, Multi-function program, the form of C-Function, Return Value and their types. Structures and Unions: Structure definition, Structure initialization, Comparison of structure variables, union.

Unit V

Pointers Understanding Pointers, Accessing the address of a variable, Declaring and initializing of pointers, accessing a variable through its pointer, Pointer expression. Pointers and arrays, Pointers and structures.

Recommended Text

E.Balagurusamy. (1996) *Programming in ANSI C*. Tata McGraw Hill, New Delhi

Reference Books

1. V.Rajaraman. (1995) *Computer Programming in C*. Prentice Hall. New Delhi
2. H. Schildt, Osborne. (1994) *Teach Yourself C* McGraw Hill. New York.
3. Mullish Cooper. *The Spirit of C- An Introduction to Modern Programming*. Jaico Publishing House. Delhi. 1998.
4. Yashavantkanetkar, let us C, 16TH edition BPB publication.

SEMESTER VI

DYNAMICS

L	P	T	C
4	0	1	4

Unit I Kinematics

Kinematics of a particle- velocity – Acceleration – Relative Velocity – Angular Velocity – Newton's Laws of Motion – Equation of Motion – Rectilinear Motion under constant acceleration - Motion in a Resisting medium

Unit II Projectiles

Projectiles – Path of a projectile - Time of Flight – Horizontal Range – Range on an inclined plane

Unit III Impulsive Motion and Impact

Impulsive Forces – Collision of Elastic Bodies : collision of two smooth spheres – Direct and Oblique Impact

Unit IV Motion in a Circle

Motion in a Circle – Simple Harmonic Motion

Unit V Central Forces

Motion under the action of Central Forces – Central Orbit as a plane curve – p-r equation of a central orbit – finding law of force for a given central orbit – finding the central orbit for a given law of force

TEXT BOOK

Dynamics by Dr. M. K. Venkatraman, Agasthiyar Publications, Thirteenth Edition

REFERENCE BOOKS

1. Mechanics - P. Duraipandian and others, S. Chand and Co.
2. Dynamics - K. Viswanathanaik and M.S. Kasi, Emerald publilshers.
3. Dynamics - A.V. Dharmapadam, S. Viswanathan Publishers

Unit I

Limit of a function on the real line- Metric spaces- Limits in metric spaces- Functions continuous at a point on the real line- Functions continuous on metric spaces-open sets- closed sets

Unit II

More about open sets-Connected sets-Bounded sets and totally bounded sets – Complete metric spaces

Unit III

Compact metric spaces- Continuous functions on compact metric spaces- Continuity of the inverse function – Uniform continuity

Unit IV

Sets of measures zero – Definition of Riemann integral – Existence of Riemann integral- Properties of Riemann integral

Unit-V

Derivatives- Rolle's theorem – The law of the mean- Fundamental theorem of calculus- Improper integrals- Taylor series- L'Hospital's rule

Recommended Text

Methods of Real Analysis- Richard R. Goldberg(oxford and IBH Publishing Co)

Reference Books

1. A course of Mathematical Analysis, Shanthi Narayan and P.K.Mittal, S.Chand & Company
2. Bartle and Sherbett, *Introduction to Real Analysis*.
3. Rudin, *Principles of Mathematical Analysis*.
4. Spivak, *Calculus on Manifolds*.
5. Chapter 1 of S. Kumaresan, *A Course in Differential Geometry and Lie Groups*.
6. L. Cohen and Ehrlick, *Structure of the Real Number System*.
7. T. Apostol, *Calculus, vols I and II*

Unit I

Introduction – Vector spaces- Definition and Examples – Subspaces- Linear transformation

Unit II

Span of set – Linear Independence- Basis and Dimension- Rank, Nullity and Matrix of linear transformation.

Unit III

Elementary transformations- Rank of a matrix- Simultaneous linear equations – Bilinear forms and Quadratic forms

Unit IV

Characteristic equation and Cayley Hamilton theorem- Eigen values and Eigen vectors

Unit V

Inner product spaces- Definition and Examples- Orthogonality- Orthogonal complement

Recommended Text

I.N.Herstein. *Topics in Algebra*. Wiley Eastern Ltd. New Delhi.

Reference Books

1. S.Arumugam. *Modern Algebra*. Scitech Publications, Chennai.
2. J.B.Fraleigh *A First Course in Algebra* (3rd Edition) Addison Wesley. Mass. (Indian Print)
3. S.Lipschutz *Beginning Linear Algebra*, Tata McGraw Hill Edition, New Delhi.
4. M.L.Santiago. *Modern Algebra*, Tata McGraw Hill, New Delhi.
5. Surjeet Singh and QaziZameeruddin. *Modern Algebra*. Vikas Publishing House Pvt. Ltd., New Delhi,

OPERATIONS RESEARCH

L	P	T	C
4	0	1	4

Unit I

Introduction – Mathematical Formulation of a Linear Programming Problem – Graphical Solution. Simplex Method: Introduction – The Computational Procedure –

Unit II

Use of Artificial Variables – Big M method – Two – phase Simplex method - concepts of duality -Duality in Linear Programming – Primal-Dual relation – Formulating a dual problem .

Unit III

Transportation Problem – Finding Initial Basic Feasible Solution – Test for Optimality – degeneracy – MODI method

Assignment Problem – Mathematical formulation – Hungarian method– Travelling sales man problem

Unit IV

Two person zero sum game with saddle point- without saddle point- dominance – solving $2 \times n$ or $m \times 2$ game by graphical methods.

Unit V

Sequencing problem – n jobs through 2 machines- n jobs through 3 machines – two jobs through m machines.

Recommended Text

KantiSwaroop, Gupta P.K. and Manmohan, *Problems in Operation Research*, Sultan Chand & Sons.

Reference Books

1. Taha H.A. *Operations Research*, Macmillan Publishing Company, New York.
2. V.K.Kapoor *Operations Research*, Sultan Chand & sons.
3. P.R.Vittal, *Operations Research*, Margham Publications, Chennai.
4. J.K.Sharma, *Operations Research: Theory And Applications* Macmillan, Delhi
5. S.J.Venkatesan, *Operations Research*, J.S. Publishes, Cheyyar-604 407.

DISCRETE MATHEMATICS AND AUTOMATA THEORY

L	P	T	C
4	0	1	4

Unit-I Logic

Introduction-TF statements-Connectives-Atomic and compound -Well formed formulae-Truth table of formula- tautology-Tautology implications and equivalence of formulae- Replacement process-Functionally complete set of connectives and duality law-Normal forms – Principle Normal forms –Theory of inference-Open statements-Quantifiers-valid formula and equivalence-theory of inference for predicate calculus-Statements involving more than one quantifier.

Unit-II Relations

Cartesian product of two sets-Relations-Representation of relations-Equivalence relations-Closures and Warshall's Algorithm-Partitions and Equivalence classes.

Unit-III Lattices and Boolean Algebra

Poset- Lattices- some properties of lattices-Modular and distributive lattices-Boolean Algebras-Boolean Polynomials-Karnaugh map-Switching circuits.

Unit-IV Finite Automata

Introduction-Finite Automata- Representation of Finite Automata –Acceptability of a string by a finite Automaton-Language accepted by a finite Automaton- Nondeterministic Finite Automata- Acceptability of a string by NFA- Equivalence of DFA and NFA-Procedure for finding an FA equivalent to a given NFA-Reduction of number of states in finite automata.

Unit-V Regular Language and Regular grammar

Formal definition of Regular expression-Language associated with RE-Connection between RE and RL- Closure properties of regular languages - Identifying some non regular languages using Pumping lemma

TEXT BOOKS:

1. Discrete Mathematics , M.K. Venkataraman, The National Publishing Company

REFERENCES BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science J.P. Trembly and Manohar, TataMcGraw-Hill Publications
2. Elements of Discrete Mathematics, Liu, Tata Mac Graw Hill
3. Kolman B, Busby R.C. and Ross S., Discrete Mathematical Structures for Computer Science, Fifth Edition, Prentice Hall of India, New Delhi, 2006.

Semester V&VI

C Practicals

The following exercises shall be performed as minimum mandatory requirements (for eligibility to take the practical examination) and a RECORD of the code-listing and outputs shall be maintained by each students.

1. Assigning the ASCII value.
2. Square of numbers: Using For loop, While loop
3. Square of numbers: Do-While loop, Goto statement.
4. Characters between two given characters.
5. Number of vowels and consonants.
6. Three – dimensional matrix.
7. Prime numbers between two give numbers.
8. Fibonacci series.
9. Factorial of numbers
10. Power of a value.
11. Interchange sort.
12. Student record.

Reference Books

1. The spirit of C, Mullish Cooper, Indian Edition by Jaico Publishers, 1987.
2. Teach yourself C, Herbert Schildt, Obsbome Megrawhill, 2nd Edition 1994.
3. Programming in C, Schaum Series.