

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005

B.Sc. MATHEMATICS COURSE STRUCTURE UNDER CBCS SYSTEM

(For the candidates admitted from the year 2016-2017 onwards)

SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U16L1T1	6	3	3	25	75	100
	English - I	English - I	U17L1E1	6	3	3	25	75	100
	Core Course - I	Differential and Integral Calculus	U16MM1C1	6	5	3	25	75	100
	Core Course - II	Probability and Statistics	-	3	-	-	-	-	-
	First Allied Course – I	Allied Physics - I	U16PH1A1	5	3	3	25	75	100
	First Allied Course - II	Allied Physics – II (Practical)	-	2	-	-	-	-	-
	Value Education	Value Education	U16VE1	2	2	3	25	75	100
				30	16				500
II	Tamil - II	Tamil – II	U16L2T2	6	3	3	25	75	100
	English – II	English– II	U16L2E2	6	3	3	25	75	100
	Core Course – II	Probability and Statistics	U16MM2C2	3	4	3	25	75	100
	Core Course – III	Trigonometry And Analytical Geometry (3D)	U16MM2C3	6	5	3	25	75	100
	First Allied Course – II	Allied Physics II (practical)	U16PH2A2P	2	4	3	25	75	100
	First Allied Course – III	Allied Physics III	U16PH2A3	5	3	3	25	75	100
	Environmental Studies	Environmental Studies	U16ES2	2	2	3	25	75	100
				30	24				700
III	Tamil – III	Tamil- III	U16L3T3	6	3	3	25	75	100
	English – III	English - III	U17L3E3	6	3	3	25	75	100
	Core Course – IV	Sequences and Series	U16MM3C4	6	5	3	25	75	100
	Core Course – V	Classical Algebra	-	3	-	-	-	-	-
	Second Allied Course I	Allied Chemistry - I	U16CH3A1	5	3	3	25	75	100
	Second Allied Course II	Allied Chemistry – II Practical	-	2	-	-	-	-	-
	Non Core Elective I	Fundamentals of Information Technology	U16CS3N1	2	2	3	25	75	100
				30	16				500
IV	Tamil – IV	Tamil- IV	U16L4T4	6	3	3	25	75	100
	English – IV	English -IV	U17L4E4	6	3	3	25	75	100
	Core Course – V	Classical Algebra	U16MM4C5	2	4	3	25	75	100
	Core Course – VI	Vector Calculus and Fourier Series	U16MM4C6	5	5	3	25	75	100
	Second Allied Course II	Allied Chemistry Practical	U16CH4A2P	2	4	3	25	75	100
	Second Allied Course III	Allied Chemistry - III	U16CH4A3	5	3	3	25	75	100
	Skill Based Elective I	Programming in C	U16MM4S1	2	4	3	25	75	100
Non Core Elective II	Office Automation and Html	U16CS4N2	2	2	3	25	75	100	
				30	28				800
V	Core Course – VII	Modern Algebra	U16MM5C7	5	5	3	25	75	100
	Core Course – VIII	Real Analysis	U16MM5C8	5	4	3	25	75	100
	Core Course – IX	Differential Equations and Laplace Transforms	U16MM5C9	4	3	3	25	75	100
	Core Course - X	Statics	U16MM5C10	6	4	3	25	75	100
	Core Elective I	Operations Research	U16MM5E1	4	4	3	25	75	100
	Skill Based Elective II	Programming in C++	U16MM5S2	2	4	3	25	75	100
	Skill Based Elective III	C++ Practical	U16MM5S3P	2	4	3	25	75	100
Soft Skill Development	Soft Skill Development	U16SSD3	2	2	3	25	75	100	
				30	30				800
VI	Core Course – XI	Complex Analysis	U16MM6C11	6	5	3	25	75	100
	Core Course – XII	Dynamics	U16MM6C12	6	5	3	25	75	100
	Core Course – XIII	Methods in Numerical Analysis	U16MM6C13	6	5	3	25	75	100
	Core Elective - II	Graph Theory	U16MM6E2	5	5	3	25	75	100
	Core Elective - III	Discrete Mathematical Structures	U16MM6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities				1			
Gender Education		U16EA4	1	1	3	25	75	100	
				30	26				600
TOTAL				180	140				3900

Sl. No.:

Subject Code:

U16MM1C1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - I SEMESTER – CORE COURSE - I

(For the candidates admitted from 2015 – 2016 onwards)

DIFFERENTIAL AND INTEGRAL CALCULUS

Course Outcomes (CO)

On the successful completion of the course, the students will be able to

1. CO1 Study the Leibnitz's theorem and its application. Also study the maxima and minima of function of two variables.
2. CO2 Study the radius of curvature in Cartesian and polar coordinates.
3. CO3 Study the definite integrals and reduction formula.
4. CO4 Understand the Beta and Gamma functions.

UNIT 1: Methods of Successive Differentiation - Leibnitz's Theorem and its Application - Increasing and Decreasing Functions - Maximum and Minimum of a Function of Two Variables

(Ch. 3: § 1.1- 2.2, Ch.4: § 2.1, 2.2 and Ch.8: § 4 and § 4.1[1])

UNIT 2: Curvature - Radius of Curvature in Cartesian and Polar coordinates – Centre of Curvature - Evolutes and Involutives.

(Ch.10: §2.1-2.6 [1])

UNIT 3: Integration by parts - Definite Integrals and Reduction Formula.

(Ch.1:§ 11-13[2])

UNIT 4: Double Integrals - Changing the order of Integration - Triple Integrals.

(Ch.5:§ 2.1, 2.2 & 4[2])

UNIT 5: Beta and Gamma functions and Relation between them - Integration using Beta and Gamma functions.

(Ch.7:§ 2.1-2.5[2])

TEXT BOOKS:

1. T. K. Manichavasagam Pillai and Others, “**Differential Calculus**”, S.V. Publications, Chennai - 1985. Revised Edition.

2. T. K. M. Pillai and others, “**Integral calculus**”, S. V. Publications,2008.

REFERENCE BOOKS:

1. Arumugam & Isaac, “**Calculus Vol I**”, New Gamma Publications,1991.

2. Arumugam & Isaac, “**Calculus Vol II**”, New Gamma Publications, 1991.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**B.SC.,-I SEMESTER – ALLIED COURSE-I****(FOR CHEMISTRY & MATHEMATICS MAJOR)****(For the candidates admitted from the year 2015-16 onwards)****ALLIED PHYSICS – I****Course Outcomes (CO)**

On the successful completion of the course, the students will be able to

1. CO1 Analyze and comprehend regarding the strength of the solid materials of different size.
2. CO2 Understand specific heat capacity of gas and the different theories on specific heat capacity.
3. CO3 Distinguish between magnetic effect of electric current and electromagnetic induction and to apply the related laws in appropriate circumstances.
4. CO4 Sound waves deals about amplitude how loud it is and its pitch.

UNIT- I: PROPERTIES OF MATTER

Stress – strain - Hooks law - Elastic constants - Young’s modulus by non-uniform bending - Static torsion - Rigidity modulus by torsion pendulum - I form of girder - Surface Tension: Surface tension of the liquid by drop weight method - Explanation of molecular theory - Viscosity: Newton’s formula - Poiseuille’s formula - stream line motion - Turbulent motion - Critical velocity - Co-efficient of viscosity - Co-efficient of viscosity by Poiseuille’s method - Ostwald’s viscometer.

UNIT-II: MECHANICS

Force - centripetal and centrifugal forces - Laws of friction - co-efficient of friction - Banking of curved tracks - Newton’s law of gravitation – Kepler’s laws of Planetary motion - Deduction of Newton’s law of gravitation from Keplers law - Centre of gravity - Centre of gravity of solid cone - Floatation laws - Stability of floating bodies.

UNIT-III: HEAT AND THERMODYNAMICS

Celcius – Rankine-Fahrenheit Scale - Entropy and Enthalpy definition - Thermal conductivity of a bad conductor by Lees Disc method - Newton’s law of cooling - Specific heat capacity of liquids - Liquification of gases – Linde’s process - Isothermal and adiabatic process - zeroth, first, second laws of thermodynamics - solar constant - Angstrom pyroheliometer

UNIT-IV: MAGNETISM AND ELECTROMAGNETISM

Magnetic materials - Properties of dia, para, ferro and anti ferro magnetic materials - Permeability and susceptibility - Laws of electromagnetic Induction - Biot and Savarts law - Force acting on a conductor carrying current in magnetic field – Moving coil galvanometer - Eddy currents – applications.

UNIT-V: SOUND

Laws of stretched strings - determination of frequency of alternating current by Sonometer - characteristics of musical sound - Acoustics of buildings – Decibel - Reverberation time - Sabine’s formula for reverberation time - Condition for good acoustics - Ultrasonics: Piezo-electric effect - piezo-electric oscillator - Properties of ultrasonic waves and its applications.

BOOKS FOR STUDY:**Unit-I**

1. Brijlal subramaniam, *Properties of matter and sound.*
2. R. Murugesan *Properties of matter and sound.*

Unit-II

1. R. Murugesan *Allied Physics I & II.*
2. A. Sundaravelusamy *Allied Physics.*

Unit-III

1. Heat and Thermodynamics - Brijlal subramaniam
2. Heat and Thermodynamics - Narayanamurthi and Nagarathinam

Unit-IV

1. Electricity and magnetism — R. Murugesan
2. Electricity and magnetism — Narayanamurthi and Nagarathinam
3. Electricity and magnetism - Brijlal subramaniam

Unit-V

1. Sound -- Brijlal subramaniam
2. Sound – R.L. Seihgal

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - II SEMESTER – CORE COURSE - II

(For the candidates admitted from 2015 – 2016 onwards)

PROBABILITY AND STATISTICS

On the successful completion of the course, the students will be able to

1. CO1 Compute conditional probabilities directly and using Bayes' theorem, and check for independence of events.
2. CO2 Set up and work with discrete random variables. In particular, understand the Bernoulli, binomial, geometric and Poisson distributions.
3. CO3 Know what expectation and variance mean and be able to compute them.
4. CO4 Understand the law of large numbers and the central limit theorem.

UNIT 1: Theory of Probability – Basic Definition – Axioms – Theorems on Probability – Conditional Probability – Bayes Theorem
(Ch.3: § 3.1-3.5 and § 3.8.5, 3.8.6, § 3.9-3.15 and § 4.2)

UNIT 2: Random variables – Discrete and Continuous types of a Random variable – Distribution Function – Probability Mass and Density function – Joint Probability distribution function.
(Ch.5: § 5.1-5.5)

UNIT 3: Expectation – Variance – Co variance – M.G.F. – Theorems on Moment Generating Function. (M.G.F.)
(Ch.6: § 6.1- 6.8, § 7.1)

UNIT 4: Correlation and Regression – Properties of Correlation and Regression coefficients – Numerical problems only.
(Ch.10: § 10.1-10.4, § 10.7, Ch.11: § 11.1-11.2)

UNIT 5: Theoretical Discrete and Continuous Distributions – Binomial, Poisson, Normal Distributions – Properties – M.G.F. – Recurrence relation for the moments about origin and Mean for the Binomial and Poisson distribution.
(Ch.8: §8.4-8.4.2, §8.5-8.5.4, § 8.5.8 and Ch.9: § 9.1-9.2.5)

TEXT BOOK:

1. Gupta S.C. and Kapoor V.K., “**Fundamentals of Mathematical Statistics**” Sultan Chand and sons, 11th Edition, 2002.

REFERENCE BOOKS:

1. J. N . Kapur and H. C. Saxena, “ **Mathematical statistics**” - S. Chand and Company Ltd ., New Delhi, 1989.
2. Marex. Fisz, “**Probability Theory and Mathematical Statistics**”, John Wiley & Sons, 1961.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - II SEMESTER – CORE COURSE - III

(For the candidates admitted from 2015 – 2016 onwards)

TRIGONOMETRY AND ANALYTICAL GEOMETRY (3D)

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Understand the expansions of trigonometric function.
2. CO2 Know the nature of hyperbolic functions and the relation between the circular and hyperbolic function
3. CO3 Find the summation of trigonometric series and logarithm of a complex Numbers
4. CO4 Recollect the properties of circle, sphere and can be able to gain a deep knowledge in it. Also to compute the equation of a circle on a sphere.
5. CO5 Analyze the concepts of right circular cone, enveloping cone, General quadric cone, Cylinder and their properties.

UNIT 1: Expansion of $\sin nx$, $\cos nx$, $\tan nx$ - Expansion of $\sin^n x$, $\cos^n x$, $\tan^n x$ - Expansion of $\sin x$, $\cos x$, $\tan x$ in powers of x .
(Ch.1:§ 1.2-1.4 [1])

UNIT 2: Hyperbolic Functions - Relation between Hyperbolic and Circular functions - Inverse Hyperbolic Functions.
(Ch.2:§ 2.1-2.2 [1])

UNIT 3: Logarithm of a Complex Number - Summation of trigonometric series - Angles in Arithmetic progression method - Gregory's series.
(Ch. 3 & Ch. 4: § 4.1, 4.2 & 4.2[2])

UNIT 4: Sphere - Standard Equation - Length of a Tangent from any point - Sphere passing through a given circle - Intersection of two spheres - Tangent plane.
(Ch. 4: § 35-41[2])

UNIT 5: Cone and Cylinder.
(Ch. 5: § 44-49[2])

TEXT BOOKS:

1. T. K. Manickavasagam Pillai and others, “**Analytical Geometry**”, S. V. Publications, Chennai- 1985. Revised Edition
2. S. Arumugam and Others, “**Trigonometry**”, New Gamma Publications - 1985.Revised Edition.

REFERENCE BOOKS:

1. Arumugam & Isaac, “**Trigonometry**”, New Gamma Publications , 2011.
2. Arumugam & Isaac, “**Analytical Geometry of 3D and Vector Calculus**”, New Gamma Publications, 2011 .

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., –II - SEMESTER – FIRST ALLIED COURSE – II
(FOR CHEMISTRY & MATHEMATICS MAJOR)
(For the candidates admitted from the year 2015-16 onwards)

ALLIED PHYSICS – II – LAB
(Any fifteen experiments)
Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Conduct experiments on stretching wires and to identify it's the strength.
2. CO2 Analyze the effects of refractive index of a medium using optical instruments.
3. CO3 Integrated chips are verified by using gate.

1. Young's Modulus – Non Uniform Bending – Pin and Microscope.
2. Torsional Pendulum – Rigidity Modulus.
3. Surface tension and Interfacial Surface tension – Drop weight method.
4. Coefficient of Viscosity of liquid using graduated burette.
5. Specific heat capacity of liquid by cooling method.
6. Lee's Disc – Thermal Conductivity of a bad conductor.
7. Focal length of a concave lens.
8. Spectrometer – Grating – Normal incidence method.
9. Spectrometer – refractive index of solid prism (A, D and μ).
10. Newton's Rings – Radius of curvature of a convex lens.
11. Sonometer – Verification of transverse laws.
12. Carey Foster's bridge – specific resistance.
13. Meter bridge – Determination of specific resistance.
14. Potentiometer – Low range voltmeter calibration.
15. Potentiometer – Calibration of ammeter.
16. Table galvanometer – Figure of merit.
17. EMF of thermocouple – Direct deflection method.
18. Characteristics of a junction diode.
19. Construction of full wave rectifiers.
20. AND, OR and NOT Logic gates - Verification of truth table using discrete Components.

BOOKS FOR REFERENCE:

1. M.N. Srinivasan and others, *A Text book of Practical Physics* - Sultan Chand & Son, New Delhi.
2. A. Dhanalakshmi and K.R. Paramasivam, *Practical Physics* - Apsara publication, Trichy.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.SC.,-II- SEMESTER – FIRST ALLIED COURSE-III
(FOR CHEMISTRY & MATHEMATICS MAJOR)
(For the candidates admitted from the year 2015-16 onwards)

ALLIED PHYSICS – III

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Predict the curvature of a transparent medium.
2. CO2 Understand the laser action phenomena, properties and applications of laser.
3. CO3 To discuss the elementary particles.
4. CO4 Have a basic knowledge of semiconductor diodes.
5. CO5 Conversion between various number systems.

UNIT- I: OPTICS

Laws of Reflection and Refraction - Refractive index of prism using spectrometer - Interference - Newton's rings - Applications - Fresnel's explanation of rectilinear propagation of light - Fiber optics: Numerical aperture, acceptance angle - Fiber optics communication system - Temperature sensor.

UNIT-II: LASER PHYSICS

Einstein's co-efficients - Spontaneous and stimulated emission - Population inversion - Optical pumping - Condition for Laser action - Semiconductor laser - CO₂ laser - Nd-YAG laser - Applications of laser - Holography - Construction and Reconstruction.

UNIT-III: ATOMIC & NUCLEAR PHYSICS

Atomic physics: Photo electric effect - Einstein photoelectric equation - Coupling schemes - LS & JJ couplings - Zeeman effect - Experiment - Stark effect (definition only) - Nuclear Physics: Detection of nuclear radiation - Geiger Muller counter - Particle accelerators: Betatron - Elementary particles: Leptons, Mesons, and Baryons.

UNIT IV: SEMICONDUCTORS AND OPTOELECTRONICS

Volt - Ampere Characteristics of P-N junction Diode - Zener diode - Applications of Zener diodes - Zener voltage regulator - Optoelectronic devices: Photovoltaic cell - Photoconductive cell - Solar cell - Phototransistor - LED and LCD - Construction and working.

UNIT-V: NUMBER SYSTEM AND DIGITAL ELECTRONICS

Binary, Octal, Hexadecimal - Interconversion - AND, OR, NAND, NOR, XOR, XNOR gates - DeMorgan's theorem - Laws of Boolean algebra - Operation Amplifiers: Ideal characteristics - Inverting - Non inverting op-amp - CMRR - Adder - Subtractor.

BOOKS FOR STUDY:

Unit-I

1. R. Murugesan, *Modern Physics*.
2. R. Murugesan, *Optics and Spectroscopy*.

Unit-II

1. Gaur and Gupta, *Engineering physics*.
2. M. Arumugam, *Engineering physics*.
3. Thiagarajan, *Laser Physics*.

Unit-III

1. R.Murugesan, *Modern Physics*.

Unit-IV

1. V.K. Metha, *Principles of Electronics*.
2. B.L. Theraja, *Basic Electronics*.

Unit-V

1. Morris Mano, *Digital Logic and Computer Design*.
2. Malvino & Leech, *Digital principles and Applications*.

Books for Referances:

1. R.Murugesan, *Allied Physics I&II*.
2. Dr.R.Sabesan & Dr.Mrs. Dhanalakshmi *Allied Physics*.

Sl. No.:

Subject Code:

U16MM3C4

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - III SEMESTER – CORE COURSE - IV

(For the candidates admitted from 2015 – 2016 onwards)

SEQUENCES AND SERIES

Course Outcomes (CO)

On the successful completion of the course, the students will be able to

- 1 CO1 Understand the basic concepts of limits, sequences and series.
- 2 CO2 Understand the concepts of Convergency and divergency and find the simple theorems.
- 3 CO3 Check the convergency and divergency by using various test.
- 4 CO4 Effectively apply the Binomial, Exponential, logarithmic theorems to the summation of series.

UNIT 1: Sequence (Definition), Limit, Convergence of a sequence – Cauchy’s general principle – Cauchy’s first theorem on limits – Bounded sequences – Monotone sequence always tends to a limit, finite or infinite – limit superior and limit inferior.
(Ch. 2: § 1-7)

UNIT 2: Infinite series – Definition of Convergence, Divergence & Oscillation series – Necessary condition for Convergence – Convergence of $\sum \frac{1}{n^p}$ and Geometric series – Comparison test, D’Alembert’s ratio test and Raabe’s test. Simple problems based on the above tests.
(Ch. 2: § 8-14, 16, 18)

UNIT 3: Cauchy’s condensation test, Cauchy’s root test and their simple problems – Alternating series with simple problems.
(Ch.2: §15,17,24)

UNIT 4: General summation of series including successive difference and recurring series.
(Ch. 5: § 2-7)

UNIT 5: Binomial Theorem for a rational index – Exponential & Logarithmic series - Summation of Series & Approximations using these theorems.
(Ch. 3: § 5-11, 14 & Ch 4: § 2-3, 5-9)

TEXT BOOK:

1. T. K. Manicavachagam, T. Natarajan, K. S. Ganapathy, “Algebra Vol. I”, S.V.Publications, 2010.

REFERENCE BOOKS:

1. Robert G. Bartle, Donald R. Sherbet, “A first course in Real Analysis”, John Wiley & Sons, 3rd Edition, 2012.
2. S. Arumugam, A. Thangapandian Issac, “Sequences & Series”, New Gamma Publishing house, 1999.
3. M. K. Singhal and Asha Rani Singhal, “A first course in Real Analysis”, S. Chand & Co., 1999.

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Subject Code:

U16CH3A1

**[GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.SC., - I & III - SEMESTER – FIRST / SECOND ALLIED COURSE - I
(For the candidates admitted from the year 2015-16 onwards)
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)**

ALLIED CHEMISTRY – I

Course Outcomes (CO)

On the successful completion of the course, the students will be able to

1. CO1 To estimate the chemical elements by using volumetric analysis.
2. CO2 To practice laboratory hygiene, first aid procedures and to identify water hardness.
3. CO3 To learn the various kinds of atomic models.
4. CO4 To follow the IUPAC nomenclature of Organic Compound, Polymer and Nuclear Chemistry.

UNIT- I Volumetric Analysis : Standard Solution – Primary and Secondary Standards – Types of titrimetric reactions – reactions – redox- precipitation– EDTA titrations. Laboratory Hygiene and Safety: Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous Chemicals. Simple first aid procedure for Accidents: Acid in eye, alkali in eye, acid burns, alkali burns, poisoning, inhalation of gases, cut by glasses and heat burns. Water: Soft water – Temporary and permanent hardness of water - Treatment of water for municipal purpose – Softening of water - Definition – Softening by Zeolite Process.

UNIT –II Atomic Structure: Rutherford’s Nuclear Atom –Bohr’s Model of the atom- Bohr Sommerfeld theory - Distribution of electrons –Pauli Exclusion Principle- Hund’s Rule of maximum Multiplicity – Aufbau Principle.

UNIT –III Radioactivity – Definition – types of radioactive rays – Nuclear energy – mass defect binding energy – magic Numbers – Nuclear fission – Nuclear fusion – difference between Nuclear fission and fusion – Nuclear power plant Isotopes, Isobars and Isotones.

UNIT –IV Classification and Nomenclature of organic of Compounds classification of organic compounds – functional groups – homologous series. IUPAC System of nomenclature of simple and complex aliphatic compounds.

UNIT –V Polymerisation – Introduction –Preparation of Polymers – addition polymers Polyethylene, PVC and Teflon) – Condensation polymers (nylon – 6,6 and terylene) Synthetic rubbers(BUNA, Butyl rubber and SBR) Thermoplastic and thermosetting plastics.

Books Recommended:

- 1.R.Gopalan, P.S.Subramanian, K.Rengarajan – Elements of Analytical Chemistry Sultan chand & Sons New Delhi -2
- 2.B.K.Sharma “Industrial Chemistry” GOEL Publishing House Meerut.
- 3.P.L.Soni and Mohan Katyal “Text Book of inorganic Chemistry 20th Revised Edition, Sultan Chand 1992.
- 4.U.N.Dash-Nuclear Chemistry Sultan Chand & Sons New Delhi-2.
- 5.I.L.Finar-Organic Chemistry. The fundamental Principles ELBS English Lan.
- 6.P.L.Soni H.M.Chawla “Text Book of organic chemistry sultan chand and sons New Delhi-2.
- 7.B.S.Bahl and Arun Bahl ‘Advanced Organice chemistry S.Chand and Co New Delhi.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc ., III SEMESTER – NON-CORE ELECTIVE – I

(FOR MATHEMATICS MAJOR)

(For the candidates admitted from the year 2015 -16 onwards)

FUNDAMENTALS OF INFORMATION TECHNOLOGY

UNIT – I

Introduction to Computers: Introduction, types of computer - characteristics of computers - classification of digital computer system - functions and components of a computer.

UNIT – II

Number system- memory units – auxiliary storage devices – input devices – output devices – decimal numbers system- binary number system- conversion-complements, Octal, Hexadecimal.

UNIT – III

Introduction to Computer software, operating systems – programming Languages – General software features and Trends

UNIT – IV

Database management system: Data processing – Introduction to Database management system – database design – Distributed system- Computer networks

UNIT – V

Internet and World Wide Web – Electronic mail – intranets – introduction to multimedia – multimedia tools – electronic commerce

TEXT BOOK:

Fundamentals of Information Technology – Alexis Leon, Mathews Leon – Leon Vikas publishing PVT Ltd., New Delhi 1999.

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U16MM4C5

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - IV SEMESTER – CORE COURSE - V

(For the candidates admitted from 2015 – 2016 onwards)

CLASSICAL ALGEBRA

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Solve an algebraic equation by using the relation between roots and coefficients.
2. CO2 Form the equations with the given roots.
3. CO3 Solve the inequalities by using arithmetic and geometric mean.
4. CO4 Understand the concept of matrices and study about the numbers.

UNIT 1: Relation between Roots and Coefficients of Polynomial equations – Symmetric functions – Sum of the Powers of the Roots – Newton’s theorem on the sum of the powers of the roots. (Ch. 6: § 11-14[1])

UNIT 2: Transformation of Equations – Diminishing, Increasing & Multiplying the Roots by a Constant – Forming equations with the given Roots – Reciprocal equations – All Types - Descartes’ Rule of Signs (Statement only) – Simple Problems. (Ch. 6: § 15-21 & 24[1])

UNIT 3: Inequalities – Elementary Principles – Geometric & Arithmetic Means – Weierstrass Inequalities – Cauchy Inequality. (Ch.4: § 4[2])

UNIT 4: Eigen values, Eigen vectors of Matrices – Cayley Hamilton’s Theorem (statement only) – Symmetric, Skew Symmetric, Orthogonal, Hermitian, Skew Hermitian and Unitary Matrices – Diagonalization - Simple problems only. (Ch. 6: § 6.1-6.3[3])

UNIT 5: Theory of Numbers – Prime and Composite Numbers – Divisors of a given Number “n” – Euler’s function and its value – The highest power of a prime P contained n! Congruence – Fermat’s, Wilson’s and Lagrange’s theorem. (Ch. 5:[2])

TEXT BOOKS:

1. T. K. Manickavasagam Pillai & others “**Algebra Vol.I**” S.V.Publications -1985.
2. T. K. Manickavasagam Pillai & others “**Algebra Vol.II**” S.V.Publications -1985.
3. S. Arumugam and A. Thangapandi Issac, “**Modern Algebra**”, New Gamma Publishing House, 2000

REFERENCE BOOK:

1. H. S. Hall and S. R. Knight, “**Higher Algebra**”, Prentice Hall of India, New Delhi , 2013.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - IV SEMESTER – CORE COURSE - VI

(For the candidates admitted from 2015 – 2016 onwards)

VECTOR CALCULUS AND FOURIER SERIES

On the successful completion of the course, the students will be able to

1. CO1 Find gradient of a vector fields and surfaces.
2. CO2 Find integral curves of vector fields and solving differential equations to find such curves.
3. CO3 Find integral ideals of the functions defined line, surface and volume integrals both derivation and calculation in rectangular and cube proofs.
4. CO4 Understand the relationship between Fourier series and linear time-invariant systems.

UNIT 1: Vector differentiation – Gradient of a Vector – Directional derivatives – Divergence and curl of a vector – Solenoidal and irrotational vectors – Laplacian Operator - Simple problems.
(Ch. 1: § 1.1-1.5 & Ch. 2 § 2.3, 2.4, 2.6, 2.8, 2.9[1])

UNIT 2: Vector integration - Conservative Force Field - Scalar potential - work done by Force - Tangential line integral - Normal surface integral - Volume integral - Simple problems.
(Ch. 3: § 3.1 – 3.6[1])

UNIT 3: Gauss divergence theorem - Stoke's theorem - Greens theorem (without proof) - Verification of theorems for simple problems.
(Ch. 4: § 4.1 – 4.8[2])

UNIT 4: Fourier series - Fourier expansion of a periodic function with period 2π and $2a$ - use of odd and even function in Fourier series.
(Ch. 6: § 1-3[2])

UNIT 5: Half range Fourier series – Sine and Cosine series - Change of interval - Combination of series – Harmonic Analysis.
(Ch. 6: § 4-8[2])

TEXT BOOKS:

1. P. Duraipandian and Laxmi Duraipandian, “**Vector Analysis**”, Emerald Publishers, 1986.
2. T. K. Manickavasagam Pillai & Others, “**Calculus Vol. III**” S. V. Publication & Vijay Nicole imprint Pvt Ltd 2004.

REFERENCE BOOKS:

1. K. Viswanathan, S. Selvaraj, “**Vector Analysis**”, Emerald, 1988.
2. Arumugam Isaac, “**Analytical Geometry of 3D and Vector Calculus**”, New Gamma Publications, 2011.

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COE

Sl. No.:

Subject Code:

U16CH4A2P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.SC., - II & IV - SEMESTER – FIRST ALLIED COURSE - I
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)
(For the candidates admitted from the year 2015-16 onwards)

ALLIED CHEMISTRY – II PRACTICAL

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Estimate the chemical elements by using volumetric analysis.
2. CO2 Practice laboratory hygiene, first aid procedures and to identify water hardness.
3. CO3 Analyze the importance of reactions of organic compounds.

1. Acidimetry and alkalimetry

- a) Strong acid Versus Strong Base
- b) Weak acid Versus Strong base.
- c) Determination of hardness of water

2. Permanganometry

- a) Estimation of ferrous sulphate using KMnO_4

- b) Estimation of oxalic acid using KMnO_4

3. Iodometry

- a) Estimation of copper using thiosulphate
- b) Estimation of $\text{K}_2\text{Cr}_2\text{O}_7$
- c) Estimation of KMnO_4 using thiosulphate

II ORGANIC ANALYSIS

A study of reactions of the following organic compounds:

1. Carbohydrate
2. Amide
3. Aldehyde
4. Acid
5. Amine
6. Phenol

The students may be trained to perform the specific reactions like

Test for element (nitrogen only) Aliphatic or aromatic,
Saturated or unsaturated and functional group present and record their observation.

Sl. No.:

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U16CH4A3

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.SC., - II & IV - SEMESTER – FIRST / SECOND ALLIED COURSE – III
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)
(For the candidates admitted from the year 2015-16 onwards)**

ALLIED CHEMISTRY – III

On the successful completion of the course, the students will be able to

1. CO1 Analyse the theory of molecular orbital and sulphur compounds and the theory of coordination compounds can be understood.
2. CO2 Review the optical properties of organic compounds and to analyse the aromaticity of hydrocarbons. Understand the chemistry of pesticides and chromatography principles.
3. CO3 Understand the various forms of catalysis and to predict knowledge of surface chemistry.

UNIT- I (15 Hours)

- 1.1 Molecular Orbital theory: Basic concepts of M.O. theory – Bonding and antibonding orbitals – Bond order – Application of M.O. theory to H₂, He₂, N₂, O₂ and F₂ molecules.
1.2 Compounds of Sulphur: Preparation, Properties, uses and structures of per acids of sulphur and sodium thiosulphate.

UNIT –II (15 hours)

Co-Ordination Chemistry: Nomenclature of Mononuclear complexes – Werner, Sidgwick theories Chelation – Application and structure of EDTA – Biological role of haemoglobin and chlorophyll (Elementary idea)

UNIT –III (15 hours)

- 3.1 Electron displacement Effect: Inductive Effect – Definition – Relative strengths of aliphatic mono carboxylic acids and aliphatic amines
3.2 Stereoisomerism: Optical isomerism – Optical activity – Chirality – Lactic and tartaric acids-racemic mixture-resolution. Geometrical isomerism – Maleic and fumaric acids.

UNIT –IV (15 hours)

- 4.1 Aromatic Hydrocarbons: Structure, Stability, Resonance and aromaticity of benzene. Electrophilic substitution reactions in benzene with mechanism – nitration, sulphonation, halogenation. Naphthalene – isolation, synthesis and properties
4.2 Organic halogen Compounds: Chemistry of Chloroform, Carbon tetra chloride, DDT, BHC and Freon -1,2

UNIT –V (15 hours)

- 5.1 Surface Chemistry: Emulsions, Gels – Definition, Preparation, Properties and applications.
5.2 Chromatography – Column, paper and thin layer chromatography.
5.3 Catalysis-types, Mechanisms and industrial applications.

Books Recommended:

1. P.L. Soni and Mohan kalyal “Text Book of Inorganic Chemistry” 20th Revised Edition, Sultan Chand 1992.
2. R.B. Puri and L.R. Sharma “Principles of Inorganic Chemistry” Sultan Chand 1989.
3. R.D. Madan “Modern inorganic Chemistry” S. Chand and Co.Pvt. Ltd., 1987 New Delhi. 4. P.L. Soni “Text Book of Inorganic Chemistry”, Sultan Chand and Co., New Delhi.
5. B.S. Bahl and ArunBahl ‘Advanced Organic Chemistry’ S.Chand and New Delhi.
6. B.R. Puri, L.R.SharmaamdmadanS.Pathania ‘Principles of Physical Chemistry’ ShobanLalNagin Chand and Co., Delhi.
7. P.L Soni “Text Book of Physical Chemistry” Sultan Chand and Co., New Delhi.

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Sl. No.:

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U16MM4S1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - IV SEMESTER – SKILL BASED ELECTIVE - I

(For the candidates admitted from 2015 – 2016 onwards)

PROGRAMMING IN C

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Write the program on a computer, edit, compile, debug, correct, recompile and run it.
2. CO2 Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task
3. CO3 Ability to work with textual information, characters and strings.
4. CO4 Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options

UNIT 1: Basic Structure of C Programs.

Constants, Variables and Data Types: Introduction – Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data Types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring a Variable as Constant.

(Ch 1: § 1.8 & Ch 2: § 2.1- 2.12)

UNIT 2: **Operators and Expressions:** Introduction - Arithmetic Operators – Relational Operators – Logical Operators- Assignment Operators – Increment and Decrement Operators – Conditional Operator - Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions - Precedence of Arithmetic Operators - Type Conversions in Expressions - Operator Precedence and Associativity - Mathematical Functions.

(Ch 3: § 3.1- 3.12 & 3.14-3.16)

UNIT 3: **Managing Input and Output Operations :**Introduction - Reading a Character - Writing a Character - Formatted Input- Formatted Output.
Decision Making and Branching: Introduction - Decision Making Withif Statement- Simple if Statement - The if ...else Statement - Nesting of if..... else Statements - The Else if Ladder- The Switch Statement - The Goto Statement.

(Ch 4: § 4.1-4.5 &Ch5: § 5.1- 5.7, 5.9)

UNIT 4: Decision Making and Looping: Introduction - The While Statement - The do Statement - The for Statement.

Arrays: Introduction - One - dimensional Arrays - Declaration of one - dimensional Arrays -Initialization of One - dimensional Arrays - Two - dimensional Arrays - Initialization of Two - dimensional Arrays .

(Ch 6: §6.1 -6.4 & Ch7: § 7.1-7.6)

UNIT 5: **User- defined Functions:** Introduction - Need for User - defined Functions - A Multi - function program - Elements of User - defined Functions - Definition of Functions - Return Values and their Types - Function Calls - Function Declaration - Nesting of Functions.

(Ch 9: §9.1-9.8& 9.15)

TEXT BOOK:

E. Balagurusamy, “**Programming In ANSI C**”, - Tata McGraw Hill Publishing company, New Delhi, 2004.

REFERENCE BOOK: R.Rajaram, “**C Programming Made Easy**”, Scitech Publications, 1999.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc ., – IV SEMESTER - NON –CORE ELECTIVE – II

(FOR MATHEMATICS MAJOR)

(For the candidates admitted from the year 2015-16 onwards)

OFFICE AUTOMATION AND HTML

UNIT – I

MS Word – Starting Word – Parts of Word Window – Mouse and Keyboard Operations - Menus, Commands, Toolbars and their Icons – Creating Word Documents – Editing Word Documents – Inserting Objects - Formatting Documents - Working with Tables – Mail Merge.**MS Excel** - Introduction - Entering and Editing text, Numbers, Formulas and Date - Menus, Commands, Toolbars and their Icons – Inserting rows and columns- Building Worksheets – Creating and formatting charts – Application of Financial and Statistical functions.

UNIT – II

MS PowerPoint: Introduction – Menus, Toolbar and Navigating in PowerPoint.
MS Access: Introduction – Parts of an Access Window: Starting MS Access – Creating a New DataBase – Creating a Database through Table Wizard – Creating a New Table – Rename Columns – Saving the Database – Relationship – Creating Table through Design View – Relationship – Query – Form – Report – Exiting MS Access.

UNIT – III

Introduction To HTML: Designing a Home Page – HTML Documents – Anchor Tag – Hyper Links – Head and Body Section: Header Section – Title – Links – Colorful Web Page – Comment Lines – Designing the Body Section: Heading Printing – Aligning The Headings – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures.

UNIT – IV

Ordered and Unordered Lists: Lists – Unordered Lists – Heading in a List – Ordered Lists – Nested Lists – Table Handling: Table – Table Creation in HTML – Width of the Table and Cells – Cells Spanning Multiple Rows/Columns – Coloring Cells – Column Specification.

UNIT – V

Frames: Frameset Definition – Frame Definition – Nested Framesets – Forms: Action Attribute – Method Attribute – Enctype Attribute – Drop Down List.

TEXT BOOKS

1. MS Office 2000 – Sanjay Saxena, Vikas Publishing House
2. World Wide Web Designing, C.Xavier, Tata McGraw Hill, 2000.

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U16MM5C7

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – CORE COURSE - VII

(For the candidates admitted from 2015 – 2016 onwards)

MODERN ALGEBRA

Course Outcomes (CO)

On the completion of this course, the students will be able to:

1. CO1 Remember the concepts of sets, mappings, relation and several examples.
2. CO2 Understand the concept of groups and find the simple proofs for results in group theory.
3. CO3 Use the results from group theory to study the properties of rings, Ideals, vector spaces and Linear transformation.
4. CO4 Apply the concepts of homomorphism and isomorphism for groups, rings, vector spaces, linear transformation and find the simple proofs.

UNIT 1: Groups - Subgroups - Cyclic groups - Order of an element - Cosets and Lagrange's theorem. (Ch. 3: § 3.5-3.8)

UNIT 2: Normal subgroups and quotient groups - Finite groups and Cayley tables -Group Homomorphism - Group Isomorphism. (Ch. 3: § 3.9-3.11)

UNIT 3: Rings - Definitions and examples - Isomorphism and homomorphism - Types of rings - Characteristics of rings - Subrings - Ideals - Quotient rings - Maximal and Prime Ideals – Homomorphism of rings – Isomorphism of rings. (Ch. 4: § 4.1-4.8 & 4.10)

UNIT 4: Vector spaces - Definition and examples - Subspaces - Linear span of a set - Linear independence, basis and dimension. (Ch. 5: § 5.1, 5.2, 5.4-5.6)

UNIT 5: Linear transformation, rank and nullity - Matrix of a linear transformation. (Ch. 5: § 5.3, 5.7, 5.8)

TEXT BOOK:

1. S. Arumugam & A. Thangapandi Issac, “**Modern Algebra**”, New Gamma Publishing House – June 1997.

REFERENCE BOOKS:

1. T.K. Manicavachagam Pillai, T.Natrajan, K.S.Ganapathi, “**Algebra, Vol I**”, S.Vishvanathan Private Ltd, Chennai, 2004.
2. M. L. Santiago, “**Modern Algebra**”, Tata McGraw Hill, 2003.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – CORE COURSE - VIII

(For the candidates admitted from 2015 – 2016 onwards)

REAL ANALYSIS

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Describe fundamental properties of the real numbers that lead to the formal development of real analysis.
2. CO2 Demonstrate an understanding of limits and how they are used in sequence, series, differentiation and integration.
3. CO3 Construct the rigorous mathematical proofs of basic results in real analysis.
4. CO4 Appreciate how abstract ideas and rigorous methods in mathematical analysis can be applied to important practical comprehend rigorous arguments developing the theory underpinning real analysis.

UNIT 1: Functions – Real valued functions - Equivalence – Countability - Real Numbers - Least Upper Bounds. (Ch 1:§1.3-1.7)

UNIT 2: Limit of a Function on the Real line – Metric Spaces – Limits in Metric spaces- Functions continuous at a point on the Real line- Reformulation. (Ch 4: §4.1-4.3 & Ch 5: §5.1, 5.2)

UNIT 3: Functions continuous on a Metric Space- Open Sets – Closed Sets- Discontinuous functions on \mathbb{R}^1 - More about Open Sets – Connected Sets. (Ch 5: § 5.3 -5.6 & Ch 6: § 6.1,6.2)

UNIT 4: Bounded Sets and totally bounded sets – Complete Metric Spaces – Compact Metric Spaces- Continuous Functions on Compact Metric Spaces – Continuity of the Inverse Function – Uniform Continuity. (Ch 6: §6.3 – 6.8)

UNIT 5: Definition of the Riemann Integral – Existence of the Riemann Integral – Properties of the Riemann Integral – Derivatives – Rolle’s Theorem – The law of the Mean – Fundamental Theorems of Calculus. (Ch 7: § 7.2-7.8)

TEXT BOOK:

1. Richard R.Goldberg, “**Methods of Real Analysis**”, Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, 1970.

REFERENCE BOOKS:

1. M.K. Singhal and A.R. Singhal, “**A First course in Real Analysis**”, R.Chand & Co,June 1997 edition.
2. Shanthi Narayan, “**A Course of Mathematical Analysis**”, S.Chand & Co, 1995.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – CORE COURSE - IX

(For the candidates admitted from 2015 – 2016 onwards)

DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Solve the first order and higher degree differential equations by using various methods.
2. CO2 Solve the second order differential equations with constant coefficients and the linear equations with variable coefficients.
3. CO3 Solve an ordinary differential equations with constant coefficients by using the Laplace Transforms.
4. CO4 Form the partial differential equations and solving these by various methods.

UNIT 1: First order and Higher Degree differential equation: solvable for x, solvable for y, solvable for dy/dx- clairaut's form – conditions of integrability of $Mdx + Ndy = 0$, Simple problems. (Ch. 1: § 3-7 & Ch. 2: §1-4 [1])

UNIT 2: Particular integrals of second order differential equations with constant coefficients (simple problems only) linear equations with variable coefficients – methods of variation of parameters. (Ch. 2: § 1-4, 8-10 [1])

UNIT 3: Laplace transforms – standard forms – basic theorems and simple applications inverse Laplace Transforms and Simultaneous Equation - Use of Laplace transforms in solving ODE with constant coefficients. (Ch. 5: § 1-8[1])

UNIT 4: Formation of partial differential equation – General, particular and complete integrals – Solutions of PDE of the standard forms – Lagrange's method of solving $Pp+Qq=R$ – Charpit's method and a few standard forms. (Ch. 4: § 1-7[1])

UNIT 5: PDE of second order homogeneous equations with constant coefficients – particular integrals of $F(D,D')Z = f(x,y)$ where $f(x,y)$ is one of the forms $e^{(ax+by)}$, $\sin(ax+by)$, $\cos(ax+by)$ and $e^{(ax+by)}f(x,y)$. (Ch. 9: § 9.13-9.19[2])

TEXT BOOKS:

1. S. Narayanan, T. K. Manicavasagam Pillai, “Calculus – Vol III”, S. Vishwanathan Publishers, 2010.
2. Dr. M. K. Venkatramanan, Mrs. Manorama Sridhar, “Differential equation and Laplace transforms”, –The National Publishing Company, 2010.

REFERENCE BOOK:

1. M. D. Raisinghania, “Ordinary and Partial differential equations”, S. Chand & Co, 2010.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – CORE COURSE - X

(For the candidates admitted from 2015 – 2016 onwards)

STATICS

Course Outcomes (Co)

On the completion of this course, the students will be able to:

1. CO1 Recollect the notions of friction and centre of gravity and deploy them in solving the respective problems.
2. CO2 Get a clear idea about the concepts of forces and moments.
3. CO3 Apply the concepts of forces in finding the resultant of more than one force acting on a surface.
4. CO4 Analyze the basics of coplanar forces and equilibrium of three forces acting on a rigid body and can solve the simple problems related to it.

UNIT 1: Forces & Equilibrium – Forces – Resultant of two forces – Three forces related to a triangle – Equilibrium of a particle under three or more forces. Forces on a rigid body – Moment – Equivalent systems of forces – Parallel forces – Varignon’s Theorem – Forces along a Triangle.

(Ch. 1: § 1-6 & Ch. 2 § 1-16 & Ch. 3 § 1-14)

UNIT 2: Couples – Equilibrium of a rigid body under three or coplanar forces – Reduction of coplanar forces into a force and a couple.

(Ch. 4: § 1-10 & Ch. 5 § 1-8 & Ch. 6 § 1-14)

UNIT 3: Friction – Laws of Friction – Coefficient of Friction, Angle & Cone of Friction – Limiting Equilibrium of a particle on a rough inclined plane, tilting of a body – Simple Problems.

(Ch. 7: § 1-14)

UNIT 4: Virtual Work – Principle of Virtual Work – Applied to a body or a system of bodies in equilibrium – Equation of Virtual Work - Simple Problems.

(Ch. 9: § 1-8)

UNIT 5: Strings – Equilibrium of Strings under Gravity – Common Catenary – Suspension bridge.

(Ch.11: § 1-9)

TEXTBOOK:

1. M. K. Venkatraman., “Statics”, Agasthiyar Publications, 2002.

REFERENCE BOOKS:

1. A. V. Dharmapadham, “Statics”, S.Viswanathan Publishers Pvt Ltd., 1979.
2. S. L. Lony, “Elements of Statics and Dynamics”, Part – I, A. I. T. Publishers, 1991.

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U16MM5E1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – ELECTIVE COURSE - I

(For the candidates admitted from 2015 – 2016 onwards)

OPERATIONS RESEARCH

Course Outcomes (CO)

On the successful completion of the course, the students will be able to

1. CO1 Apply for finding solutions of general linear programming by Simplex computational Procedure
2. CO2 Apply for finding feasible solutions by Artificial technique
3. CO3 Apply for finding solutions using duality problems.
4. CO4 Apply for finding solutions by Game theory, Sequencing and replacement problems, assignment problem and transportation problems.

UNIT 1: Introduction to Operation Research: Linear Programming Problem – formulation of LPP – Graphical solution – Simplex method – Big M method – Two phase simplex method. (Ch. 1, 2, 3, 4)

UNIT 2: Duality in LPP – formulating of Primal – dual pair – duality and simplex method – dual simplex method. (Ch. 5)

UNIT 3: Transportation problem – transportation algorithm – degeneracy in transportation problem, unbalanced transportation problem – assignment problem – unbalanced assignment. (Ch. 10, 11)

UNIT 4: Sequencing and replacement problems. (Ch. 12,18)

UNIT 5: Game theory – two person zero sum game – maxmin and minimax principle – game without saddle point – mixed strategy – graphical method – dominance properties – matrix method. (Ch. 17)

(In all the units no book work need to be proved – only applications of book works need to be taught)

TEXT BOOK:

1. Kanthi Swaroop, Gupta, P.K. & Manmohan, “**Operation Research**”, Sultan Chand & Co, 13th edition, 2007.

REFERENCE BOOKS:

1. Hamdy A. Taha, “**Operation Research**” (9th edn), Prentice Hall of India, 2012.
2. Richard Bronson, “**Theory and Problems of Operation Research**”, Tata McGraw Hill Publishing Company Ltd, New Delhi, 1982.

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U16MM5S2

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – SKILL BASED ELECTIVE - II

(For the candidates admitted from 2015 – 2016 onwards)

PROGRAMMING IN C++

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Use classes, constructors, destructors, inheritance, and operator overloading and the Standard Template Library in C++
2. CO2 Create a program that measures or simulates performance and use it to analyze behavior
3. CO3 Understand advanced use of arrays in C++ programming.
4. CO4 Understand functions in C++ programming.

UNIT 1: Software Evolution - OOP Paradigm - Basic Concepts of OOP - Benefits of OOP - Object - Oriented Languages - Applications of OOP.

Beginning With C++ : What is C++? - Applications of C++ - A simple C++ Program - More C++ Statements - An Example with Class - Structure of C++ Program .

(Ch 1:§1.2 & 1.4- 1.8, Ch 2: § 2.1-2.6)

UNIT 2: **Tokens, Expressions and Control Structures:** Tokens - Keywords - Identifiers and Constants - Basic Data Types - reference variables - Manipulators - Expressions and their Types - Control Structures.

(Ch 3: §3.2-3.5, 3.12, 3.17,3.19,3.24)

UNIT 3: **Functions in C++:** Introduction - The Main Function - Function Prototyping Call by reference - Inline functions - Function Overloading - Friend and Virtual Functions.

Classes and Objects: Specifying a Class - Defining Member Functions - Nesting of Member Functions- Private Member Functions - Arrays within a Class-Static data members- Static member functions .

(Ch4: §4.2-4.6,4.9,4.10 &Ch5: §5.3,5.4,5.7-5.9,5.11,5.12)

UNIT 4: **Constructors and Destructors:** Constructors - Parameterized Constructors - Multiple Constructors in a Class - Constructors with Default Arguments - Copy Constructors - Destructors - Operator Overloading and Type Conversions: Defining Operator Overloading - Overloading Unary Operators - Overloading Binary Operators - Rules for Overloading Operators - Type Conversions.

(Ch6: § 6.2-6.5, 6.7,6.11 & Ch7: §7.2-7.4, 7.7,7.8)

UNIT 5: **Inheritance:** Defining derived Classes - Single Inheritance - Multi level Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance.

Working with Files: Opening and Closing a File - Detecting end- of - File.

(Ch8: §8.2,8.3,8.5-8.8 & Ch 11: §11.3,11.4)

TEXT BOOK: E. Balagurusamy, “**Object Oriented Programming With C++**”,Tata McGraw Hill Education Pvt Ltd, 2010.

REFERENCE BOOK: Radha Ganesan, “ **Programming with C++**”, Scitech Publications (India) Pvt Ltd, Chennai 2002.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - V SEMESTER – SKILL BASED ELECTIVE - III

(For the candidates admitted from 2015 – 2016 onwards)

C++ PRACTICAL

Course Outcomes (Co)

On successful completion of the course, the students will be able to

1. CO1 Understand the nature of software development.
2. CO2 Create simple programs using classes and objects in C++.
3. CO3 Develop applications using stream I/O and file I/O.
4. CO4 Implement Object Oriented Programs using templates and exceptional handling concepts.

1. Write a C++ Program to create a student class .
2. Write a C++ Program for friend functions.
3. Write a C++ Program to implement Object as function argument .
4. Write a C++ Program using a function overloading .
5. Write a C++ Program using an operator overloading .
6. Write a C++ Program using Nesting of Member Functions.
7. Write a C++ Program for static function.
8. Write a C++ Program using an inline function.
9. Write a C++ Program to implement a student record using constructor.
10. Write a C++ Program for Copy Constructor.
11. Write a C++ Program using Destructor.
12. Write a C++ Program to implement single Inheritance.
13. Write a C++ Program to implement multiple inheritance.
14. Write a C++ Program to implement multilevel inheritance.
15. Write a C++ Program to implement Hybrid Inheritance.

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U16MM6C11

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - VI SEMESTER – CORE COURSE - XI

(For the candidates admitted from 2015 – 2016 onwards)

COMPLEX ANALYSIS

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Explain the fundamental concepts of complex analysis and their role in modern mathematics and applied contexts.
2. CO2 Demonstrate accurate and efficient use of complex analysis techniques.
3. CO3 Demonstrate capacity for mathematical reasoning through analyzing, proving and explaining concepts from complex analysis.
4. CO4 Apply problem solving using complex analysis techniques applied to diverse situations in physics, engineering and other mathematical contexts.

UNIT 1: Functions of a Complex variable : Limits – Theorems on Limits – Continuous functions – Differentiability – Cauchy-Riemann equations – Analytic functions – Harmonic functions. (Ch.2: § 2.1-2.8)

UNIT 2: Elementary transformations : Bilinear transformations – Cross ratio – Fixed points of Bilinear transformations – Some special Bilinear transformations. (Ch.3: § 3.1-3.5)

UNIT 3: Complex Integration : Definite Integral – Cauchy’s Theorem – Cauchy’s Integral formula – Higher derivatives. (Ch.6: § 6.1-6.4)

UNIT 4: Series expansions : Taylor’s series – Laurent’s series – Zeroes of analytic functions – Singularities. (Ch.7: § 7.1-7.4)

UNIT 5: Residues : Cauchy’s Residue Theorem – Evaluation of Definite integrals. (Ch.8: § 8.1-8.3)

TEXT BOOK:

1. S. Arumugam, A. Thangapandi Issac, & A. Somasundaram, “**Complex Analysis**”, New Scitech Publications (India) Pvt Ltd, 2002.

REFERENCE BOOKS:

1. J. N. Sharma, “**Functions of a Complex variable**”, Krishna Prakasan Media (P) Ltd, 13th Edition, 1996-97.
2. T. K. Manickavasagam Pillai, “**Complex Analysis**”, S. Viswanathan Publishers Pvt Ltd, 1994.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - VI SEMESTER – CORE COURSE - XII

(For the candidates admitted from 2015 – 2016 onwards)

DYNAMICS

Course Outcomes (CO)

On the successful completion of the course, the students will be able to

1. CO1 Demonstrate their understanding of the principles of kinematics and kinetics of particles and planar rigid bodies
2. CO2 Analyze planar rigid body kinematics and kinetics
3. CO3 Solve equations of projectiles, moment of inertia and simple harmonic motions.
4. CO4 Illustrate the mathematical aspects that provide the skills and problem techniques in kinematics of point and Newton's laws of motion.

UNIT 1: Kinematics: Velocity- Relative Velocity –Angular Velocity- Acceleration- Properties and related problems – Newton's Laws of Motion- Work – Power – Energy- Kinetic Energy – Potential Energy – Principle of Conservation of Energy- Properties and related problems.

(Ch 3 :§ 3.1 – 3.31 and Ch 4: § 4.1- 4.12 & 4.24-4.35)

UNIT 2: Projectiles – Definition - Path of Projectile – Range on the Inclined Plane- Properties and problems – Impulsive Force- Impulse and Impact.

(Ch 6: § 6.1-6.16 & Ch 7: § 7.1-7.6)

UNIT 3: Collision of Elastic Bodies – Direct and Oblique Impact – Loss of Kinetic Energy – Related properties and problems – Simple Harmonic Motion and related problems.

(Ch 8: § 8.1- 8.10 & Ch 10: § 10.1-10.7)

UNIT 4: Central Orbits – Motion under action of Central forces- Properties and related problems- Differential Equations of Central Orbit - Pedal Equation of Central Orbit- Velocities in Central Orbit – Law of Forces – Properties and related problems

(Ch 11: §11.1- 11.14)

UNIT 5: Moment of Inertia – Definition – Theorem of Parallel axes – The Theorem of Perpendicular axes – Moment of Inertia in some particular cases – Dr. Routh's Rule.

(Ch 12: §12.1-12.5)

TEXT BOOK:

1. Dr. M. K.Venkatraman, “**Dynamics**”, Agasthiar Publications, 13th Edition,2009.

REFERENCE BOOKS:

1. P. Duraipandian, “**Vector Treatment as in Mechanics**”, S. Chand & Co - June 1997 edition.
2. A.V. Dharmapadam, “**Dynamics**”, S. Vishwanathan Publishers, 1981.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - VI SEMESTER – CORE COURSE - XIII

(For the candidates admitted from 2015 – 2016 onwards)

METHODS IN NUMERICAL ANALYSIS

Course Outcomes (Co)

On the successful completion of the course, the students will be able to

1. CO1 Derive numerical methods for approximating the solution of the problems of algebraic and transcendental equations, ordinary and partial differential equations.
2. CO2 Implement a variety of numerical algorithms using appropriate technology.
3. CO3 Get practical knowledge of polynomial interpolation. Also numerical algorithms are used in C++ for solving scientific problems.
4. CO4 Solve the ordinary differential equations by using the methods like Euler's, Runge Kutta, Modified Euler and Improved Euler.

UNIT 1: Algebraic and Transcendental equations – Finding a root of the given equation (Derivation of the formula not needed) using Bisection Method, Method of False Position, Newton Raphson Method, Iteration Method.

(Ch.2: § 2.1-2.5)

UNIT 2: Finite differences – Forward, Backward & Central Differences – Their symbolic relations – Newton's Forward & Backward difference interpolation formulae – Interpolation with unevenly spaced intervals – Application of Lagrange's interpolating Polynomial (Proof not needed) – Divided differences and their properties – Application of Newton's General Interpolating formula. (Proof not needed)

(Ch.3: § 3.1, 3.3, 3.6, 3.9, 3.9.1, 3.10, 3.10.1)

UNIT 3: Numerical Differentiation – Numerical Integration using Trapezoidal rule & Simpson's 1/3rd & 3/8th – Theory & Problems.

(Ch.4: § 4.2, 4.4, 4.4.1, 4.4.2)

UNIT 4: Solutions to Linear systems – Gaussian elimination Method – Gauss Jacobi, Gauss Jordan & Gauss Seidal Iterative Methods – Theory & Problems.

(Ch.5: § 5.4)

UNIT 5: Numerical solution of ODE – Solution by Taylor Series Method, Euler's Method, Runge Kutta 2nd and 4th order methods (Derivation of the formula not needed) – Theory and Problems using Adam's Predictor Corrector Method & Milne's Predictor Corrector Methods. (Ch.6: § 6.1, 6.2, 6.4, 6.5, 6.6.1, 6.6.2)

[In all the units the value of a root may be calculated upto 3 decimal accuracy only]

TEXTBOOK:

1. S. S. Sastry, "Introductory Methods of Numerical Analysis", Prentice Hall of India Pvt Ltd, 1995.

REFERENCE BOOKS:

1. S. Narayanan & Others, "Numerical Analysis", S. Viswanathan Publishers 1994.
2. A. Singaravelu, "Numerical Methods", Meenachi Agency, June 2000

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - VI SEMESTER – ELECTIVE COURSE - II

(For the candidates admitted from 2015 – 2016 onwards)

GRAPH THEORY

Course Outcomes (CO)

On the successful completion of the course, the students will be able to

1. CO1 Give examples and counter examples
2. CO2 Know the proof techniques
3. CO3 Understand the problem solving methods
4. CO4 Apply the methods in real life applications

UNIT 1: Definition of a Graph – Finite and Infinite Graphs – incidence, Degree isolated and pendent vertices – Isomorphism – Subgraphs – Walks, Paths and Circuits - connected and disconnected graphs – Components Euler Graphs – Operations on graphs – more on Euler graphs – Hamiltonian Paths and Circuits.
(Ch. 1: § 1.1-1.5, Ch.2:§ 2.2,2.4-2.9)

UNIT 2: Trees- Properties of trees – Pendent vertices in a tree – Distances and centres in a tree- Rooted and Binary trees- Spanning trees – Fundamental circuits – Finding all spanning trees of a graph – Spanning trees in a weighted graphs.
(Ch.3:§ 3.1-3.10)

UNIT 3: Cut sets – Properties of a cut set – All cut sets in a graph – Fundamental circuits and cut set – Connectivity and separability.
(Ch.4:§ 4.1-4.5)

UNIT 4: Planar and Dual graphs – Planar graphs – Kuratowski’s two graphs – Different representation of a planar graphs- detection of a planarity - geometric dual- Combinatorial dual.
(Ch.5:§ 5.2-5.7)

UNIT 5: Matrix representation of a graph- Incident matrix- circuit matrix – Fundamental circuit matrix and rank of a matrix- cut set matrix- Adjacency matrix.
(Ch.7:§ 7.1-7.4,7.6-7.9)

TEXT BOOK:

1. Narsingh Deo, “**Graph theory with applications to Engineering and Computer Sciences**”, Prentice Hall of India New Delhi, 1997.

REFERENCE BOOKS:

1. Dr. Arumugam and Dr. S. Ramachandran, “**Invitation to graph theory**”, scitech Publication India Pvt Ltd, Chennai,2001.
2. K.R.Parthasarathy, “**Basic Graph Theory**”, Tata McGraw Hill publishing co, New Delhi,1994.
3. G.T.John Clark, Derek Allon Halton, “**A first look at Graph Theory**”, world scientific publishing co,1995.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., MATHEMATICS - VI SEMESTER – ELECTIVE COURSE - III

(For the candidates admitted from 2015 – 2016 onwards)

DISCRETE MATHEMATICAL STRUCTURES

Course Outcomes (Co)

On the successful completion of this course, the students will be able to:

1. CO1 Understand the basic concepts of Logical Operators.
2. CO2 Perform the derivation of statement formulas involving one or more quantifiers.
3. CO3 Understand the basic concepts of semi groups and monoids. Using this concept some theorems are proved.
4. CO4 Minimize the Boolean function by using the Karnaugh map method.

UNIT 1: Propositional Logic: Statements and Notation, symbolic representation and tautologies. Normal forms- disjunctive normal form – conjunctive normal form – principal disjunctive normal forms- principal conjunctive normal forms.
(Ch. 1 §.1.1 to 1.3)

UNIT 2: Predicate Calculus: Quantifiers – predicates – symbolic representation – Free and bound variables - the universe of discourse – theory of inference for the predicate calculus – Formulae involving more than one quantifier. (Ch. 1 §.1.5, 1.6)

UNIT 3: Semi Groups and Monoids: Definition and Examples of semi groups and monoids – homomorphism of semi groups and monoids – Sub Semigroups and submonoids – Examples. (Ch.3 §.3.2)

UNIT 4: Lattices: Partially Ordered Sets – Some Properties of Lattices – Lattices as Algebraic Systems – sublattices – direct products and homomorphism – some special lattices – Complete, Complemented, Distributive lattice. (Ch. 4 §.4.1)

UNIT 5: Boolean Algebra: Definition and examples – various Boolean identities – sub algebra – direct product – homomorphism – minterms Boolean forms – sum of product of canonical forms – minimization of Boolean function – application of Boolean Algebra – The Karnaugh map method. (Ch. 4 §.4.2 to 4.4)

TEXT BOOK:

1. J. P. Trembley and R. Manohar, “Discrete Mathematical Structures with Application to Computer Science”, Tata McGraw Hill Publishing Company Ltd, 2010.

REFERENCE BOOKS:

1. J. L. Gersting, “Mathematical Structures For a Computer Science”,
2. 3rd Edition, Computer Science Press, New York.
2. G. Liu, “Elements of Discrete Mathematics”, McGraw Hill Book co, 2007.
3. Dr. M. K. Venkatramanan, N. Sridharam, N. Chandrasekeran, “Discrete Mathematics”, National publishing company, 2000.

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