**VINAYAKA MISSIONS UNIVERSITY, SALEM**

**Faculty of arts and science**

**Department of mathematics**

**Board of studies**

**2017-18**

**B.Sc - MATHEMATICS**

**CURRICULUM - REGULATIONS 2017**

1. Ability Enhancement Compulsory Course (Theory) - 02 Papers
2. Discipline Specific Course (Theory)(Core Papers - 10 Papers
3. Discipline Specific Course-Foundation Course - 04 Papers

(English and Tamil)

1. Generic Elective (Interdisciplinary – Theory) - 02 Papers
2. Discipline Specific Elective Course - 04 Papers
3. Skill Enhancement Course - 04 Papers

 **Total – 26 Papers**

**Total Number of Credits: 8+60+12+12+24+16= 132 Credits**

***COMPONENET - ABBREVIATIONS***

Ability Enhancement Compulsory Course - AECC

Discipline Specific Course - Theory - DSCT

Generic Elective (Interdisciplinary) Theory - GET

Discipline Specific Elective Course - DSEC

Skill Enhancement Course - SEC

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| **SEM** | **COMPONENT** | **PAPER TITLE** | **CREDITS** |
| **I** | DSCT - I | Foundation Course-I- Tamil – I / Hindi – I | 03 |
| DSCT-I | Foundation Course-I- English-I | 03 |
| DSCT – I | Core I: Differential Calculus | 5+1 |
| DSEC – I | Matrices and Laplace Transform | 5+1 |
| AECC-I | Environmental Science | 04 |
|  | **Total** | **22** |

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| **SEM** | **COMPONENT** | **PAPER TITLE** | **CREDITS** |
| **II** | DSCT-II | Foundation Course-II- Tamil – II / Hindi – II | 03 |
| DSCT – II | Foundation Course-II- English-II | 03 |
| DSCT- II | Core II: Differential Equations | 5+1 |
| DSEC – II | Probability and Statistics | 5+1 |
| AECC-II | English Communication  | 04 |
|  | **Total** | **22** |

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| **SEM** | **COMPONENT** | **PAPER TITLE** | **CREDITS** |
| **III** | DSCT-III | Core III: Analytical Solid Geometry -3D | 5+1 |
| DSEC - III | Discrete Mathematics | 5+1 |
| SEC- I | Theory Of Equations | 04 |
| GET – I | Problem Solving using C-programming- Theory | 04 |
| GET – I | Problem Solving using C-programming - Practical | 02 |
|  | **Total** | **22** |

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| **SEM** | **COMPONENT** | **PAPER TITLE** | **CREDITS** |
| **IV** | DSCT-IV | Core IV: Vector Calculus And Fourier Series | 5+1 |
| DSCT-V | Core V: Abstract Algebra  | 5+1 |
| SEC- II | Operation Research | 04 |
| SEC-III | Yoga | 04 |
|  | **Total** | **20** |

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| **SEM** | **COMPONENT** | **PAPER TITLE** | **CREDITS** |
| **V** | DSCT-VI | Core VI : Linear Algebra  | 5+1 |
| DSCT-VII | Core VII: Real Analysis-I | 5+1 |
| GET – II | Research Methodology  | 5+1 |
| SEC-IV | Partial Differential Equations and Transforms | 04 |
|  | **Total** | **22** |

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| **SEM** | **COMPONENT** | **PAPER TITLE** | **CREDITS** |
| **VI** | DSCT-VIII | Core VIII: Real Analysis-II | 5+1 |
| DSCT-IX | Core IX: Complex Analysis | 5+1 |
| DSCT-X | Core-X :Numerical Methods | 5+1 |
| DSEC-IV | Dissertation / Mini Project | 5+1 |
|  | **Total** | **24** |

**Total number of Credits=132+4\***

* Student can choose any one interdisciplinary paper having 4 credits which is not compulsory but in condition that students pass that paper. This 4 credits should not be included for calculating the overall CGPA.

**B.Sc.Mathematics (132 Credits)**

**Discipline Specific Course - 6 Credits per Course (10\*6=60 Credits)**

1. Sequence and Series
2. Differential Equations
3. Analytical Solid Geometry -3D
4. Vector calculus and Fourier Series
5. Differential Calculus
6. Numerical Methods
7. Abstract Algebra
8. Real Analysis –I
9. Linear Algebra
10. Real Analysis –II
11. Complex Analysis
12. Group Theory

**Discipline Specific Elective Course - - 6 Credits per course (4\*6=24 Credits)**

1. Matrices and Laplace transform
2. Probability and Statistics
3. Discrete Mathematics
4. Dynamics
5. Research Methodology
6. Dissertation / Mini Project
7. Number Theory

**Generic Elective (Interdisciplinary) - - 6 Credit per Course (2\*6=12 Credits)**

1. General Physics
2. Fundamentals of Computer
3. Problem solving using C-programming-Theory &Practical
4. Media & Communication Skills
5. General Chemistry
6. Business Communication
7. Disaster Management

**Foundation Course (Tamil & English )- 3 Credits per Course (4\*3=12 Credits)**

1. English-I
2. English-II
3. Tamil-I/Hindi I
4. Tamil/Hindi-II

**Ability Enhanced Compulsory Course - 4 Credits per Course (2\*4=8 Credits)**

1. Environmental Science
2. English Communication / MIL Communication

**Skill Enhanced Course - 4 Credits per course (4\*4=16 Credits)**

1. Value Education-Yoga
2. Partial Differential Equations and Transforms
3. Operation Research
4. Graph Theory
5. Theory of Equation
6. Financial Mathematics
7. LATEX Theory
8. Transportation and Game Theory
9. Boolean Algebra

**VINAYAKA MISSIONS UNIVERSITY, SALEM**

**BOARD OF SCIENCES**

**B.Sc– MATHEMATICS-REGULAR**

**REGULATIONS-2017**

**SYLLABUS**

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| **YEAR** | **SEMESTER** | **TITLE OF PAPER****Discipline Specific Core Course:****Differential Calculus** | **L** | **T** | **P** | **C** |
| **I** | **I** | **B.Sc-Mathematics** | **5** | **1** | **0** | **6** |

**Objectives**

* Differential calculus can be used to determine the stationary points of functions, in order to sketch their graphs.
* To give a comprehensive idea about the underlying principles of differentiationand integration of functions.
* To have a good foundation in all the concepts of variation and summation.

.**Unit I**

 Introduction to Derivatives – Differentiation of Implicit, Explicit and Logarithmic functions – Successive Differentiation – Standard results – Leibnitz formula for nth derivative and applications – Meaning of the derivatives.

**Unit II**

 Partial Derivatives – Definition – Successive partial derivatives – Function of a function rule – Total differential co-efficient– Implicit function –Homogeneous function and Euler’s theorem – Jocobian theorem.

**Unit III**

 Polar coordinates- Angle between the tangent and the radius vector- Slope of the tangent in polar co-ordinates – Angle of intersection of two curves – Pedal equation of a curve - Curvature – Radius of curvature, Circle of curvature and center of curvature in Cartesian..

**Unit IV**

 Evolutes and Involutes – Definition – Envelopes – Definition - Method of finding envelopes – Asymptotes – Special cases.

**Unit V**

 Radius of curvature in polar co-ordinates and **p-r** equation – Equations of a straight line, a circle and a conic in polar co-ordinates – Standard equations only. Tracing of the curves cardioids, r=a+bcosθ, r=a sinθ, r=acosθ, and the cycloid X=a(θ±sinθ), Y=a( θ±cosθ)

**Text Books**

1. T.K. Manickavasagampillai and S.Narayanan , DIFFERENTIAL CALCULUS, Vijay Nicole imprints Prt, ltd, Nelson Manickam Road, Chennai -600029,

**Reference Books**

1. Dr. P.R. Vittal and Malini, DIFFERENTIAL CALCULUS, Margham Publication, 24,Rameswaram road, T.Nagar, Chennai-600017.

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| **YEAR** | **SEMESTER** | **TITLE OF PAPER****Discipline Specific Elective: Matrices and Laplace Transforms** | **L** | **T** | **P** | **C** |
| **I** | **I** | **B.Sc-Mathematics** | **5** | **1** | **0** | **6** |

**OBJECTIVES:**

* To understand the basic concepts in Matrices
* To understand the basic concepts in Laplace Transforms and Inverse Laplace Transforms.

**UNIT I : INTRODUCTION TO MATRIX**

 Types of Matrices-Matrix operations – Inverse of a Matrix, Rank of a Matrix- Solution of System of linear equations using Matrices

**UNIT II: EIGEN VALUES AND EIGEN VECTORS**

 Eigen values and Eigen Vectors- Properties -Cayley Hamilton Theorem-applications

**UNIT III: DIAGONILISATION AND QUADRATIC FORMS**

 Diagonlisation- Symmetrical Transformation-Orthogonal Transformation-Quadratic form-reduction of quadratic form by orthogonal transformation.

**UNIT IV: LAPLACE TRANSFORMS**

Laplace transform – transform of elementary functions – basic properties – derivatives and integrals of transforms – transforms of derivatives and integrals – initial and final value theorems – Transform of periodic functions.

**UNIT V: APPLICATION OF LAPLACE TRANSFORMS**

Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms.

**Text Book :-**

1. P.R.Vittal, Mathematical Founadations , Margham Publications.
2. Kandasamy .P.,Thilagavathy. K., and Gunavathy. K., “Engineering Mathematics”,Volumes I,II& III (4th edition), S.Chand& Co., New Delhi., 2001

**Reference Book:-**

1. Grewal, B.S., “Higher Engineering Mathematics” (36th Edition),
2. Veerarajan, T., “Engineering Mathematics”, Tata McGraw Hill Publishing Co., NewDelhi, 2006.

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| **YEAR** | **SEMESTER** | **TITLE OF PAPER****Discipline Specific Core Course:** **Differential Equations** | **L** | **T** | **P** | **C** |
| **I** | **II** | **B.Sc-Mathematics** | **5** | **1** | **0** | **6** |

**OBJECTIVES:**

* To understand the basic concepts in Ordinary Differential Equations.
* To understand the basic concepts in Partial Differential Equations.

**Unit I**

 Differential equations – Equations of 1st order and higher degree – Equations solvable for p – Solvable for x-solvable for y – Clairaut’s form – Exact differential equations - Method of obtaining solution to exact differential equation.

**Unit II**

 Second order differential equations with constant coefficients – Particular integrals of eax V where V is of the form x, x2, sin ax and cosax.

**Unit III**

 Second order differential equations with variable coefficients – Both homogeneous linear equations and non-linear homogeneous equations – Method of variation of parameters.

**Unit IV**

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – General, Particular and Complete integrals -– Solutions of the partial differential equations of standard types – Lagrange’s method of solving-Charpit’s methods and a few standard forms.

**Unit V**

 PDE of second order homogeneous equation with constsnt coefficients-Particular integrals of f(D,D’)z=f(x,y) , where f(x,y) is one of the forms , and 

**Text Books**

1. T.K. Manickavasagampillai and S.Narayanan , DIFFERENTIAL EQUATIONS, Vijay Nicole imprints Prt, Ltd, -7, Nelson Manickam Road, Chennai -600029.

**Reference Books**

1. S. Arumugam, DIFFERENTIAL EQUATIONS, Scitech Publications Pvt Ltd, Chennai

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| **YEAR** | **SEMESTER** | **TITLE OF PAPER****Discipline specific Elective Course- Probability and Statistics** | **L** | **T** | **P** | **C** |
| **I** | **II** | **B.Sc-Mathematics** | **5** | **1** | **0** | **6** |

**OBJECTIVES:**

* To understand the basic concepts of Probability and Random Variables
* To understand the basic concepts in Discrete distributions and Continuous distribution
* To understand the basic concepts of Statistics, Central Tendency.
* To understand the basic concepts of Correlation and Regression.

**Unit – I Introduction to Probability**

 Introduction – Probability axioms – Conditional probability – Baye’s theorem - Independent evens.

**Unit – II Random Variables**

 Random variable – Probability distribution of a random variable – Discrete & continuous variable – Expected value – Functions of a random variable – Moment generating functions.

**Unit – III Standard Distributions**

Binomial distribution – Poisson distribution – Geometric, Normal, Exponential distribution.

**Unit – IVMeasures of central tendency and Dispersion**

Measures of central tendency –Mean, Median, Mode, Measures of Dispersion – Range, Quartile deviation, Standard Deviation, Mean Deviation and their Coefficients.

**Unit – VCorrelation and Regresion**

Correlation- Rank Correlation- Regression lines.

**Text Book:**

1. B.K Gupta Manmohan, MATHEMATICAL STATISTICS, S.Chand& Co, New Delhi.

**Reference Book: -**

 1. P.K Gupta, STATISTICS, S.Chand& Co.

 2. P.R.Vittal, STATISTICS, Margham publications.