*With effect from: 2021-22 (R-21)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

**CALCULUS for B.E., I- Sem., (CBCS)**
**(Common to Civil, EEE, ECE, Mech)**

| | | |
|---|---|---|
| Instruction : 3 +1 Hours per week | Sem. End Exam Marks : 60 | Subject Reference Code : **U21BS110MA** |
| Credits : 3 | Sessional Marks: 40 | Duration of Semester End Exam : 3 Hrs |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students should be able to:*** |
| **1. Understand** The concepts of curvature, radius of curvature, evolutes and to expand functions using Taylor's series.<br><br>**2. Acquire** knowledge of partial derivatives, and expand functions using Taylor's series functions of two real variables and, maxima- minima.<br><br>**3. Study** the concepts of vector differentiation, Gradient, Divergence and Curl.<br>**4.Learn** how to evaluate double and triple integrals, using change of order of integration and apply vector integration to transformation theorems<br>**5. Identify** convergence of infinite series using various tests. | **1. Compute** radius of curvature, evolute of a given curve and also to expand given function using Taylor's series.<br><br>**2. Expand** the given function in terms of Taylor's series and find Maxima and minima of functions of several variables also using Lagrange's method of multipliers.<br>**3. Use** gradient to evaluate directional derivatives and conservative vector field.<br>**4. Apply** concepts of multiple integrals to evaluate area and volume and vector integration to transformation.<br>**5. Apply** an appropriate test to check the nature of the infinite series. |

**UNIT- I (10 classes)**

**DIFFERENTIAL CALCULUS**

Taylor's Series – Maclaurin's Series- Curvature- Radius of Curvature – Centre of Curvature –Evolutes. (Cartesian and Parametric co-ordinates)

**UNIT –II (12 classes)**

**FUNCTIONS OF SEVERAL REAL BVARIABLES**

Limits- Continuity -Partial Derivatives-Higher Order Partial Derivatives-Total Derivates - Derivatives of Composite and implicit functions - Taylor's series of functions of two variables - Maxima and Minima of functions of two variables - Lagrange's Method of multipliers.

## UNIT – III ( 08 classes)

### VECTOR DIFFERENTIAL CALCULUS

Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field-Conservative vector field.

## UNIT – IV (12 classes)

**MULTIPLE INTEGRALS:** Double and Triple integrals (Cartesian) - Change of order of integration (Cartesian Coordinates).

**VECTOR INTEGRATION:** Line, Surface and Volume integrals- Green's Theorem – Gauss Divergence theorem - Stokes's Theorem. (all theorems without proof). Solenoidal and Irrotational vectors.

## UNIT-V (08 classes)

### INFINITE SERIES

Definition of Sequences- Series – Convergence and Divergence- Series of positive terms- Geometric series- p-series test - Comparison tests - D'Alemberts Ratio Test – Cauchy's root test - Alternating Series – Leibnitz test – Absolute and Conditional convergence.

**Text Books:**

1 Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2 Higher Engineering Mathematics, B. S. Grewal 40th. Edition, Khanna Publishers.

**Reference Books:**

1 Advanced Engineering Mathematics 8th Edition by Erwin Kreyszig , John Wiley & Sons.
2 Differential Calculus by Shanti Narayan S. Chand & Co
3 Vector Calculus – Schaum's outline series.

**Online Resources :**

1 **http://mathworld.wolfram.com/topics**
2 **http://www.nptel.ac.in/course.php**
3 **https://www.coursera.org/in**

The break-up of CIE : Internal Tests + Assignments + Quizzes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | No. of Internal Tests | : | 2 | Max. Marks for each Internal Tests | : | 30 |
| 2 | No. of Assignments | : | 3 | Max. Marks for each Assignment | : | 5 |
| 3 | No. of Quizzes | : | 3 | Max. Marks for each Quiz Test | : | 5 |
| | Duration of Internal Tests | : | 90 Minutes | | | |

| | | | |
|---|---|---|---|
| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

*With effect from: 2021-22 (R-21)*

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

**DEPARTMENT OF MATHEMATICS**

**CALCULUS & LINEAR ALGEBRA for B.E., I- Sem., (CBCS)**

**(Common to CSE, CSE-AIML & IT)**

| | | |
|---|---|---|
| **Instruction** : 3 +1 Hours per week | **Sem. End Exam Marks** : 60 | **Subject Reference Code : U21BS120MA** |
| **Credits** : 3 | **Sessional Marks:** 40 | **Duration of Semester End Exam** : 3 Hrs |

| **COURSE OBJECTIVES** | **COURSE OUTCOMES** |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students should be able to:*** |
| **1. Understand** The concepts of curvature, radius of curvature, evolutes and to expand functions using Taylor's series. | **1. Compute** radius of curvature, evolute of a given curve and also to expand given function using Taylor's series. |
| **2. Acquire** knowledge of partial derivatives, and expand functions using Taylor's series functions of two real variables and maxima- minima. | **2. Expand** the given function in terms of Taylor's series and find Maxima and minima of functions of several variables also using Lagrange's method of multipliers. |
| **3.Study** the concepts of Vector Spaces, Subspaces, and use in Linear transformations and study Rank-Nullity theorem | **3. Apply** concepts of Vector Spaces on Linear transformations and Rank-Nullity theorem |
| **4. Learn** Inner Product Spaces, Orthonormal sets, Gram-Schmidt's Orthogonalization process. | **4. Determine** distance using Inner product space and construct Orthonormal basis using Gram-Schmidt's Orthogonalization process. |
| **5. Identify** convergence of infinite series using various tests. | **5. Apply** an appropriate test to check the nature of the infinite series. |

**UNIT- I (08 classes)**

**DIFFERENTIAL CALCULUS**

Taylor's Series – Maclaurin's Series- Curvature- Radius of Curvature – Centre of Curvature –Evolutes. (Cartesian and Parametric co-ordinates)

**UNIT –II ( 12 classes)**

**FUNCTIONS OF SEVERAL REAL VARIABLES**

Limits- Continuity -Partial Derivatives-Higher Order Partial Derivatives-Total Derivates - Derivatives of Composite and implicit functions - Taylor's series of functions of two variables - Maxima and Minima of functions of two variables - Lagrange's Method of multipliers.

**UNIT-III: (12 classes)**

**VECTOR SPACES**

Definition of Vector Space - Vector Subspaces –Linear Dependence and Independence of vectors- Basis of a Vector Space –Dimension of a Vector Space – Linear Transformation- Inverse Linear Transformation- Range and kernel of a linear map – Dimension of Range and Kernel - Rank and nullity – Rank nullity theorem (without proof)

**UNIT-IV (12 classes)**

**MATRICES**

Rank of a Matrix- Characteristic equation- -Eigen values and Eigenvectors-Orthogonal Transformation -Diagonalization using Similarity Transformation- Inner Product Space-Gram-Schmidt's Ortho-normalization process.

**UNIT-V (08 classes)**

**INFINITE SERIES**

Definition of Sequences- Series – Convergence and Divergence- Series of positive terms-Geometric series- p-series test - Comparison tests - D'Alemberts Ratio Test – Cauchy's root test - Alternating Series – Leibnitz test – Absolute and Conditional convergence.

**Text Books:**


1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, B. S. Grewal 40th. Edition, Khanna Publishers.
3. Introduction to linear algebra with applications, Jim DeFranza, Daniel Gagliardi, Tata McGraw-Hill
4. Operational Mathematics by R.V. Churchill, Mc Graw-Hill Book Company, INC.


**Reference Books:**


1. Advanced Engineering Mathematics 8th Edition by Erwin Kreyszig , John Wiley & Sons.
2. Differential Calculus by Shanti Narayan S. Chand & Co
3. Elementary Linear algebra, Anton and Rorres, Wiley India Edition
5. An introduction to Linear Algebra, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd


**Online Resources :**

1. **http://mathworld.wolfram.com/topics**
2. **http://www.nptel.ac.in/course.php**
3. **https://www.coursera.org/in**
4. **https://codingthematrix.com**

The break-up of CIE : Internal Tests + Assignments + Quizzes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | No. of Internal Tests | : | 2 | Max. Marks for each Internal Tests | : | 30 |
| 2 | No. of Assignments | : | 3 | Max. Marks for each Assignment | : | 5 |
| 3 | No. of Quizzes | : | 3 | Max. Marks for each Quiz Test | : | 5 |
| | Duration of Internal Tests | : | 90 Minutes | | | |

| | | | |
|---|---|---|---|
| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

*With effect from: 2021-22 (R-21)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

### DIFFERENTIAL EQUATIONS & COMPLEX ANALYSIS for B.E., II- Sem., (CBCS)
### (Common to Civil, EEE, ECE, Mech)

| | | |
|---|---|---|
| Instruction : 3+1 Hours per week | Semester End Exam Marks : 60 | Subject Reference Code : **U21BS210MA** |
| Credits : 3 | Sessional Marks: 40 | Duration of Semester End Exam : 3 Hrs |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to :*** | ***At the end of the course students should be able to:*** |
| **1. Study** the concepts of matrices, Eigen values and Eigen vectors, Diagonalization and canonical form of a quadratic form.<br>**2. Solve** first order differential equations using elementary techniques and learn its applications.<br>**3.Use** the various higher order homogeneous and non-homogeneous linear differential equations with constant coefficients to solve it and apply on electrical circuits<br>**4. Understand** the Analytic functions, conditions and harmonic functions.<br>**5. Evaluate** a line integral of a function of a complex variable using Cauchy's integral formula, and how to evaluate Taylor's and Laurent Series. | **1. Find** the rank of a given matrix, diagonalizable a given matrix and reduce a quadratic form to canonical form and find its nature.<br>**2. Identify** the suitable I.F and solve differential equations, model the real time electrical engineering problems viz., RC & LR Circuits into differential equations and solve.<br>**3. Apply** various higher order Linear Differential equations, to solve LC and LCR circuits.<br>**4. Apply** the condition(s) for a complex variable function to be analytic and/or harmonic and to construct an Analytic function.<br>**5. Evaluate** complex integrals by Cauchy's theorem and Cauchy's Integral formula and define singularities of a function and to expand a given function as a Taylor's / Laurent's series. |

## UNIT – I (12 classes)

### MATRICES

Rank of a Matrix- Linearly independence and dependence of Vectors - Characteristic equation- -Eigen values and Eigenvectors - Cayley - Hamilton Theorem (without proof)- Diagonalization using Similarity Transformation.

**UNIT – II (10 classes)**

**ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER**

Exact first order differential equations - Integrating factors- Clairaut's equation -Applications of First Order Differential Equations -Orthogonal trajectories (Cartesian families) – LR and RC Circuits.

**UNIT – III (12 classes)**

**HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS**

Solutions of Homogeneous and Non Homogeneous linear equations with constant coefficients- Method of Variation of Parameters –Applications of linear differential equations to LCR circuits

**UNIT – IV (08 classes)**

**DIFFERENTIATION OF COMPLEX FUNCTION**

Limits and Continuity of function - Differentiability and Analyticity - Necessary & Sufficient Condition for a Function to be Analytic - Milne-Thompson's method -Harmonic Functions.

**UNIT – V (10 classes)**

**INTEGRATION OF COMPLEX FUNCTION**

Complex Integration- Cauchy's Theorem - Extension of Cauchy's Theorem for multiply connected regions- Cauchy's Integral Formula - Power series - Taylor's Series - Laurent's Series (without proofs) –Poles and Residues.

**Text Books:**


1. Advanced Engineering Mathematics 3rd Edition, R.K.Jain & S.R.K.Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics 40th Edition Dr. B.S Grewal, Khanna Publishers.
3. A Text book of Engineering Mathematics, N.P.Bali & Manish Goyal, Laxmi Publications.


**Reference Books:**


1 Advanced Engineering Mathematics, by Wylie & Barrett, Tata Mc Graw Hill, New Delhi.
2 Advanced Engineering Mathematics, 8th Edition by Erwin Kreyszig , John Wiley & Sons, Inc.
3 Complex Variables and applications, J.W.Brown and R.V.Churchill, 7th Edition, Tata Mc Graw Hill,2004.


**Online Resources :**

1 **http://mathworld.wolfram.com/topics**
2 **http://www.nptel.ac.in/course.php**
3 **https://www.coursera.org/in**
4 **http://davidbau.com**

The break-up of CIE : Internal Tests + Assignments + Quizzes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | No. of Internal Tests | : | 2 | Max. Marks for each Internal Tests | : | 30 |
| 2 | No. of Assignments | : | 3 | Max. Marks for each Assignment | : | 5 |
| 3 | No. of Quizzes | : | 3 | Max. Marks for each Quiz Test | : | 5 |
| | Duration of Internal Tests | : | 90 Minutes | | | |

| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
|---|---|---|---|
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

*With effect from: 2021-22 (R-21)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderbad-500031

## DEPARTMENT OF MATHEMATICS

### DIFFERENTIAL EQUATIONS & VECTOR CALCULUS for B.E., II- Sem., (CBCS)
**(Common to CSE, CSE-AIML & IT)**

| | | |
|---|---|---|
| Instruction : 3+1 Hours per week | Semester End Exam Marks : 60 | Subject Reference Code : **U21BS220MA** |
| Credits : 3 | Sessional Marks: 40 | Duration of Semester End Exam : 3 Hrs |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to :*** | ***At the end of the course students should be able to:*** |
| **1. Solve** first order differential equations using elementary techniques and learn its applications. | **1. Identify** the suitable I.F and solve differential equations, model the real time electrical engineering problems viz., RC & LR Circuits into differential equations and solve. |
| **2.Use** the various higher order homogeneous and non-homogeneous linear differential equations with constant coefficients to solve it and apply on electrical circuits | **2. Apply** various higher order Linear Differential equations, to solve LC and LCR circuits. |
| **3. Study** the concepts of vector differentiation, Gradient, Divergence and Curl. | **3. Use** gradient to evaluate directional derivatives and conservative vector field. |
| **4.Learn** how to evaluate double and triple integrals, using change of order of integration and apply vector integration to transformation theorems | **4. Apply** concepts of multiple integrals to evaluate area and volume and vector integration to transformation |
| **5.Understand** Beta, Gamma functions and Error functions | **5. Evaluate** Improper integrals and Beta ,Gamma functions |

**UNIT – I (10 classes)**

**ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER**

Exact first order differential equations - Integrating factors- Clairaut's equation -Applications of First Order Differential Equations -Orthogonal trajectories (Cartesian families) – LR and RC Circuits.

**UNIT – II (12 classes)**

**HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS**

Solutions of Homogeneous and Non Homogeneous linear equations with constant coefficients- Method of Variation of Parameters –Applications of linear differential equations to LCR circuits.

**UNIT – III ( 08classes)**

**VECTOR DIFFERENTIAL CALCULUS**

Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field-Conservative vector field.

**UNIT – IV (12 classes)**

**MULTIPLE INTEGRALS:** Double and Triple integrals (Cartesian) - Change of order of integration (Cartesian Coordinates).

**VECTOR INTEGRATION:** Line, Surface and Volume integrals- Green's Theorem – Gauss Divergence theorem - Stokes's Theorem. (all theorems without proof)- Solenoidal and Irrotational vectors.

**UNIT – V (08 classes)**

**BETA-GAMMA FUNCTIONS**

Improper integrals-Beta, Gamma functions- Error functions-complimentary error functions

**Text Books:**

1. Higher Engineering Mathematics 40th Edition Dr. B.S Grewal, Khanna Publishers.
2. Advanced Engineering Mathematics 3rd Edition, R.K.Jain & S.R.K.Iyengar, Narosa Publishing House.
3. A Text book of Engineering Mathematics, N.P.Bali & Manish Goyal, Laxmi Publications.

**Reference Books:**

1. Advanced Engineering Mathematics, by Wylie & Barrett, Tata Mc Graw Hill, New Delhi.
2. Advanced Engineering Mathematics, 8th Edition by Erwin Kreyszig, John Wiley & Sons, Inc.

**Online Resources:**

1. **http://tutorial.math.lamar.edu/Classes/DE/DE.aspx**
2. **http://mathworld.wolfram.com/topics**
3. **http://www.nptel.ac.in/course.php**
4. **https://www.coursera.org/in**

The break-up of CIE : Internal Tests + Assignments + Quizzes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | No. of Internal Tests | : | 2 | Max. Marks for each Internal Tests | : | 30 |
| 2 | No. of Assignments | : | 3 | Max. Marks for each Assignment | : | 5 |
| 3 | No. of Quizzes | : | 3 | Max. Marks for each Quiz Test | : | 5 |
| | Duration of Internal Tests | : | 90 Minutes | | | |

| | | | |
|---|---|---|---|
| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
**DEPARTMENT OF INFORMATION TECHNOLOGY**
**(B.E. Semester - II)**

## Mathematics Lab (Calculus, Linear Algebra & Differential equations)

| | | |
|---|---|---|
| Instruction: 2 Hours / week | SEE Marks :50 | Course Code:U21BS211MA |
| Credits : 1 | CIE Marks: 30 | Duration of SEE : 3 Hrs |

| **Course Objectives** | **Course Outcomes** |
|---|---|
| **The course will enable the students to:** | **At the end of the course student will be able to:** |
| Demonstrate the linear algebra, calculus and differential equation concepts using Scilab. | 1. Demonstrate the knowledge of Scilab basics for numerical analysis and visualization.<br>2. Apply Matrix basic operations and its analysis.<br>3. Demonstrate the use of matrix decompositions and solving of linear equations.<br>4. Apply calculus theorems to examine extreme values of a function.<br>5. Demonstrate the knowledge of solving Differential equations. |

1. Introduction to Scilab and evaluating elementary functions.
2. Basic operations on Matrix & Vector.
3. Matrix analysis: Rank, Determinant, Trace, Orthogonal basis & Inverse of matrices.
4. Eigen values and Eigenvectors of Matrix.
5. Matrix decompositions: SVD, QR, LU, Pseudo Inverse
6. Solve system of linear equations.
7. Data plotting (2D,3D) of various mathematical functions.
8. Test the convergence of infinite series i.e., power, Taylor.
9. Intro to calculus and examine minima, maxima and saddle points of a given function.
10. Application of definite integrals to area & volume calculations.
11. Solving differential equations.

**Learning Resources:**

1. https://www.scilab.org/tutorials\
2. Scilab - Course (swayam2.ac.in)
3. Scilab_Tutorial.pdf (iitb.ac.in)

| | | | |
|---|---|---|---|
| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman,BOS ) |

*with effect from :2019-20 (R-19)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

## PDE & TRANSFORM TECHNIQUES
## for B.E., III- Sem., (CBCS)
**(Civil, EEE & Mechanical only)**

| | | |
|---|---|---|
| **Instruction :3 +1 Hours per week** | **Semester End Exam Marks : 60** | **Subject Reference Code : U19BS310MA** |
| **Credits : 3** | **Sessional Marks : 40** | **Duration of Semester End Exam : 3 Hrs.** |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students will be able to:*** |
| 1. ***Study*** *the Fourier series, conditions for expansion of function and half range series* | 1. ***Expand*** *any function which is continuous, Discontinuous, even or odd in terms of its Fourier series.* |
| 2. ***Formulate*** *and understand linear and nonlinear partial differential equations.* | 2. ***Formulate*** *the Partial differential equations by eliminating arbitrary constants and functions and solve linear, non linear Partial differential equations.* |
| 3. ***Study*** *the applications of Partial Differential equations* | 3. ***Solve the*** *one dimensional wave(Vibrations of a string), heat equations and two dimensional heat equations.* |
| 4. ***Understand*** *the Definition of Laplace and inverse Laplace Transforms-Shifting Properties and various theorems and how to apply them in solving Differential Equations.* | 4. ***Evaluate*** *Laplace transforms and inverse Laplace transforms of functions. Apply Laplace transforms to solve ordinary differential equations arising in engineering problems.* |
| 5. ***Study*** *the concept of Fourier and inverse Fourier Transform of a function and various properties.* | 5. ***Determine*** *Fourier transform, Fourier sine and cosine transform of a function.* |

**UNIT-I (14 Hours)**

**Laplace Transforms**: Introduction to Laplace transforms - Inverse Laplace transform - Sufficient Condition for Existence of Laplace Transform –Properties of Laplace Transform- Laplace Transform of Derivatives - Laplace Transform of Integrals - Multiplication by $t^n$ - Division by t – Evaluation of Integrals by Laplace Transforms- Convolution Theorem - Application of Laplace transforms to Initial value Problems with Constant Coefficients.

**UNIT –II (10 Hours)**

**Fourier series:** Introduction to Fourier series – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions - Fourier Expansion of Half- range Sine and Cosine series.

**UNIT-III (10 Hours)**

**Fourier Transforms:** Fourier Integral Theorem (without Proof) - Fourier Transforms – Inverse Fourier Transform - Properties of Fourier Transform –Fourier Cosine & Sine Transforms.

N. Vasudha

(Chairman, BOS)

**UNIT –IV (10 Hours)**

**Partial Differential Equations :** Formation of first and second order Partial Differential Equations - Solution of First Order Equations – Linear Equation - Lagrange's Equation - Non-linear first order equations – Standard Forms.

**UNIT-III (8 Hours)**

**Applications of Partial Differential Equations**: Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two Dimensional Heat equation Laplace's Equation-(Temperature distribution in long plates).

**Text Books:**

1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

**Reference Books:**

1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.

**Online Resources :**

1. **http://tutorial.math.lamar.edu/Classes/DE/DE.aspx**
2. **http://mathworld.wolfram.com/topics**
3. **http://www.nptel.ac.in/course.php**

| (Prof. N. Kishan ) | (Prof. D.Srinivasacharya) | (Prof.A. Ramu) | ( Dr. B Srivathsa ) 18-5-19 |
|---|---|---|---|
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Industry Expert) |

(Dr.N Vasudha)
(Chairman)

*with effect from :2019-20 (R-19)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

## TRANSFORM TECHNIQUES, PROBABILITY & STATISTICS
## for B.E., III- Sem., (CBCS)

***(For CSE only)***

| | | |
|---|---|---|
| **Instruction :3 +1 Hours per week** | **Semester End Exam Marks : 60** | **Subject Reference Code : U19BS320MA** |
| **Credits : 3** | **Sessional Marks : 40** | **Duration of Semester End Exam : 3 Hrs.** |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students will be able to:*** |
| 1. ***Study*** *the Fourier series, conditions for expansion of function and half range series* | 1. ***Expand*** *any function which is continuous, Discontinuous, even or odd in terms of its Fourier series.* |
| 2. ***Study*** *the concept of Fourier, Sine, Cosine and inverse Fourier Transform Sine and Cosine transform of a function and various properties.* | 2. ***Determine*** *Fourier transform, Fourier sine and cosine transform and inverse Fourier, Sine and Cosine transform of a function.* |
| 3. ***Study*** *various methods of testing large samples* | 3. ***Infer*** *properties of population conducting tests on samples* |
| 4. ***Analyze*** *standard statistical tests employed for small samples* | 4. ***Categorize*** *population based on tests on small samples* |
| 5. ***Understand*** *fitting of a straight line to a given data and measuring Correlation between variables* | 5. ***Solve*** *problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems.* |

**UNIT –I (10 Hours)**

**Fourier series:** Introduction to Fourier series – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions - Fourier Expansion of Half- range Sine and Cosine series.

**UNIT-II (10 Hours)**

**Fourier Transforms:** Fourier Integral Theorem (without Proof) - Fourier Transforms – Inverse Fourier Transform - Properties of Fourier Transform –Fourier Cosine & Sine Transforms.

**UNIT-III(10 Hours)**

**Probability:**

Random Variables - Discrete and Continuous Random variables-Properties- Distribution functions and densities - Expectation – Variance –Normal Distributions.

N. Vasudha.

(Chairman, BoS)

**UNIT-IV(12 Hours)**

**Test of Hypothesis**

Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance- Confidence Intervals -Tests of Significance for small samples - t-test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit..

**UNIT-V (10 Hours)**

**Regression & Correlation :**

The Method of Least Squares - Fitting of Straight line- Regression - Lines of Regression- Correlation – Karl Pearson's Co-efficient of Correlation

**Text Books:**

1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

**Reference Books:**

1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
3. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.

(Prof. N. Kishan )
(OU Nominee)

(Prof. D.Srinivasacharya)
(Subject Expert -1)

(Prof.A. Ramu)
(Subject Expert-2)

( Dr. B Srivathsa ) 16.6.15
(Industry Expert)

(Dr.N Vasudha)
(Chairman)

*with effect from :2019-20 (R-19)*

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
**DEPARTMENT OF MATHEMATICS**

# PDE & NUMERICAL METHODS
## for B.E., III- Sem., (CBCS)
***(For ECE only)***

| | | |
|---|---|---|
| **Instruction :3 +1 Hours per week** | **Semester End Exam Marks : 60** | **Subject Reference Code : U19BS330MA** |
| **Credits : 3** | **Sessional Marks : 40** | **Duration of Semester End Exam : 3 Hrs.** |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students will be able to:*** |
| 1. ***Formulate*** *and understand linear and nonlinear partial differential equations.* | 1. ***Formulate t****he Partial differential equations by eliminating arbitrary constants and functions and solve linear, non linear Partial differential equations.* |
| 2. ***Study*** *the applications of Partial Differential equations* | 2. ***Solve the*** *one dimensional wave(Vibrations of a string), heat equations and two dimensional heat equations.* |
| 3. ***Study t****he methods to solve algebraic and transcendental equations, apply numerical methods to interpolate.* | 3. ***Solve*** *algebraic and transcendental equations using Bisection method Regula-Falsi, Newton-Raphson and apply numerical methods to interpolate.* |
| 4. ***Understand*** *numerical differentiation and integrate functions and to solve differential equations using numerical methods.* | 4. ***Solve*** *problems using numerical differentiation using interpolation approach and differential equations using numerical methods.* |
| 5. ***Study*** *the method to fit different curves to a given data, how Correlation between variables can be measured..* | 5. ***Solve*** *problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation and to determine regression lines and their applications.* |

**UNIT –I (10 Hours)**
**Partial Differential Equations:**
Formation of first and second order Partial Differential Equations - Solution of First Order Equations – Linear Equation - Lagrange's Equation- Non-linear first order equations -Standard Forms.

**UNIT-II (10 Hours)**
**Applications of Partial Differential Equations:**
Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two Dimensional Heat equation- Laplace's Equation- (Temperature distribution in long plates).

N. Vasudha
(Chairman, BOS)

**UNIT-III (10 Hours)**
**Interpolation :**
Finite Differences- Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's Divided difference formula.

**UNIT –IV (12 Hours)**
**Numerical solutions of ODE:**
Numerical Differentiation -Interpolation approach- Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method - Runge-Kutta Method of $4^{th}$ order(without proofs).

**UNIT-V (10 Hours)**
**Curve Fitting:**
Curve fitting by the Method of Least Squares - Fitting of Straight line-Second degree parabola- Regression - Lines of Regression - Correlation – Karl Pearson's Co-efficient of Correlation.

**Text Books:**

1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

**Reference Books:**

1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.

**Online Resources :**

1. **http://tutorial.math.lamar.edu/Classes/DE/DE.aspx**
2. **http://mathworld.wolfram.com/topics**
3. **http://www.nptel.ac.in/course.php**

| | | | |
|---|---|---|---|
| (Prof. N. Kishan ) | (Prof. D.Srinivasacharya) | (Prof.A. Ramu) | ( Dr. B Srivathsa ) 18.5.19 |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Industry Expert) |

(Dr.N Vasudha)
(Chairman)

*with effect from :2019-20 (R-18)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

### DISCRETE MATHEMATICS
### for B.E., III- Sem., (CBCS)
### *(for IT only)*

| | | |
|---|---|---|
| **Instruction :3 +1 Hours per week** | **Semester End Exam Marks : 60** | **Subject Reference Code : U18BS340MA** |
| **Credits : 3** | **Sessional Marks : 40** | **Duration of Semester End Exam : 3 Hrs.** |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| *The course will enable the students to:* | *At the end of the course students will be able to:* |
| 1. ***Understand*** Propositions and their equivalences, predicates and quantifiers and learn various proof strategies. | 1. *Use* logical notation to define and reason about fundamental mathematical concepts and *synthesize* induction hypothesis and simple *Induction* proofs. |
| 2. Study the concepts of number theory such Modular Arithmetic, Congruences and basic cryptography etc.. | 2. *Prove* elementary properties of modular arithmetic and basic cryptography and apply in Computer Science. |
| 3. Understand the basics of counting, combinatory, and various methods of solving Recurrence relations. | 3. *Calculate* number of possible outcomes of elementary combinatorial processes such as permutations and combinations *Model* and analyze computational processes using analytic and Combinatorial methods. |
| 4. *Understand* Relations, Equivalence relations, Posets and Hasse diagrams. | 4. **Prove** whether a given relation is an equivalence relation poset and will be able to draw a Hasse diagram. |
| 5. *Analyze* **the concepts of Graphs.** | 5. *Apply* graph theory models of data structures and to solve problems of connectivity. |

**UNIT – I (10 Hours)**

**Logic:** Logic- Logical connectives- Propositional equivalences– Predicates and quantifiers – Nested quantifiers.

**Mathematical Reasoning, Induction:** Proof Strategy- Methods of Proofs- Mathematical Induction- Second Principle of Mathematical Induction.

**UNIT – II (10 Hours)**

**Number Theory:** The Integers and Division- Division Algorithm- Fundamental Theorem of Arithmetic –Modular Arithmetic-Integers and Algorithms- Euclidean Algorithm. Applications of Number Theory-Linear Congruences- The Chinese Remainder Theorem (without Proof)- Fermat's Little Theorem- Public key cryptography- RSA Encryption and Decryption.

N. Vasundhara.
(Chairman, BOS)

**UNIT – III (12 Hours)**

**Counting:** Basics of counting- Pigeonhole principle- Permutations and combinations – Pascal's Identity- Vandermonde's Identity- Generalized Permutations and combinations.

**Advanced Counting Techniques:** Recurrence relations: Solving Recurrence Relations- Linear Homogeneous and Non-Homogeneous Recurrence relations.

**UNIT – IV (10 Hours)**

**Relations:** Relations – Properties -Representing relations - Equivalence Relations - Partial Orderings- Poset- Hasse diagrams – Maximal & Minimal Elements.

**UNIT –V (10 Hours)**

**Graph Theory:** Introduction- Types of graphs- Graph terminology- Basic theorems- Representing Graphs and Graph Isomorphism - Connectivity- Euler and Hamiltonian paths - Planar graphs- Euler's Formula- Graph coloring- Basic Definitions.

**Text Books:**


1. Kenneth H.Rosen – Discrete Mathematics and its application – 5th edition, Mc Graw – Hill, 2003.
2. Joel. Mott. Abraham Kandel, T.P.Baker, Discrete Mathematics for Computer Scientist & Mathematicans, Prentiee Hail N.J., 2nd edn, 1986.


**Reference Books:**


1. Discrete and Combinatorial Mathematics by Ralph P. Grimaldi , Pearson International
2. J.P.Trembly, R.Manohar, Discrete Mathematical Structure with Application to Computer Science, Mc Graw- Hill – 1997.
3. R.K. Bisht, H.S.Dhami - Discrete Mathematics, Oxford University Press, 2015.


**Online Resources:**

1. **http://mathworld.wolfram.com/topics**
2. **http://www.nptel.ac.in/course.php**

(Prof. N. Kishan )
(OU Nominee)

(Prof. D.Srinivasacharya)
(Subject Expert -1)

(Prof.A. Ramu)
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( Dr. B Srivathsa ) 8.5.19
(Industry Expert)

N. Vasudha.

(Dr.N Vasudha)
(Chairman)

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**
IBRAHIMBAGH, HYDERABAD – 500 031
**DEPARTMENT OF MATHEMATICS**

## LINEAR ALGEBRA AND ITS APPLICATIONS
## (OPEN ELECTIVE-I for all branches of 2/4 B.E sem-3)

Name of the Faculty: Mr.Y.Bhanu Prakash

| | | |
|---|---|---|
| L:T:P (Hrs./week):2:0:0 | SEE Marks :60 | Course Code: **U190E310MA** |
| Credits : 2 | CIE Marks: 40 | Duration of SEE: 3 Hrs |

**UNIT – I** (8 classes)
Vector Spaces-Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis.

**UNIT – II** (6 classes)
Linear Transformation -I
Definition of Linear Transformation- Properties of Linear Transformations – Product of Linear Transformations – Algebra of Linear Operators.

**UNIT – III** (6 classes)
Linear Transformation -II
Range and kernel of a linear map – Dimension of Range and Kernel - Rank and nullity – Inverse of linear transformation - Rank nullity theorem (without Proof)- Matrix of Linear Transformation.

**UNIT – IV** (8 classes)
Inner Product Spaces-The Dot Product on R and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements, Application: Least Squares Approximation

**Learning Resources**:

1. Introduction to Linear Algebra with Application, Author : Jim Defranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill

2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

**Reference Books:**

(i) Elementary Linear Algebra, Author : Anton and Rorres, Publisher : Wiley India Edition.
(ii) Advanced Engineering Mathematics, Author : Erwin Kreysig, Publisher : Wiley Publication
(iii) Elementary Linear Algebra, Author : Ron Larson, Publisher : Cengage Learning

The break-up of CIE : Internal Tests + Assignments + Quizzes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | No of Internal Tests | : | 2 | Max. Marks for each Internal Tests | : | 30 |
| 2 | No. of Assignments | : | 2 | Max. Marks for each Assignment | : | 5 |
| 3 | No. of Quizzes | : | 2 | Max. Marks for each Quiz Test | : | 5 |
| Duration of Internal Tests | | : | 90 | Minutes | | |

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23/08/21

*With effect from the 2021-22*

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**
**DEPARTMENT OF MATHEMATICS**

**MATRIX THEORY & VECTOR CALCULUS**
**BRIDGE COURSE B.E. III-SEMESTER (CBCS)**
**(For CSE, EEE, ECE & IT)**

| | | | | | |
|---|---|---|---|---|---|
| Instruction: | 2 hours/Week | SEE Marks | : 50 | Subject Reference Code | **UB20BS300MA** |
| Credits: | - | CIE Marks | : - | Duration of SEE | 3 Hrs |

**UNIT-I: (4 Hours)**
**DIFFERENTIATION & INTEGRATION**

Differentiation of standard functions(Formulae) - Partial Derivatives – Derivative of Composite functions and Implicit functions - Chain Rule - Total Derivative
Integration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

**UNIT – II (6 Hours)**
**VECTOR DIFFERENTIATION**
Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface - Directional Derivative – Divergence and Curl of a Vector field - Conservative vector field.

**UNIT – III (6 Hours)**
**VECTOR INTEGRATION**
Line, Surface and Volume integrals- Green's Theorem – Gauss Divergence theorem - Stokes's Theorem. (all theorems without proof).

**UNIT- IV(8 Hours)**
**MATRIX THEORY**
Rank of matrix- Echelon form - -System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

**Suggested Books**:


1. B.S. Grewal, Higher Engineering Mathematics
2.


| | | | |
|---|---|---|---|
| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

T. SUDHAKAR RAO
Asst. Professor
Dept. of Mathematics
Vasavi College of Engg.

*With effect from the 2021-22*

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**
**DEPARTMENT OF MATHEMATICS**

**MATRIX THEORY & VECTOR CALCULUS**
**BRIDGE COURSE B.E. II-SEMESTER (CBCS)**
**(For CIVIL & MECH)**

| | | | | | |
|---|---|---|---|---|---|
| Instruction: | 2 hours/Week | SEE Marks | : 50 | Subject Reference Code | **UB20BS400MA** |
| Credits: | - | CIE Marks | : - | Duration of SEE | 3 Hrs |

**UNIT-I: (4 Hours)**
**DIFFERENTIATION & INTEGRATION**

Differentiation of standard functions(Formulae) - Partial Derivatives – Derivative of Composite functions and Implicit functions - Chain Rule - Total Derivative
Integration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

**UNIT – II (6 Hours)**
**VECTOR DIFFERENTIATION**
Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface - Directional Derivative – Divergence and Curl of a Vector field - Conservative vector field.

**UNIT – III (6 Hours)**
**VECTOR INTEGRATION**
Line, Surface and Volume integrals- Green's Theorem – Gauss Divergence theorem - Stokes's Theorem. (all theorems without proof).

**UNIT- IV(8 Hours)**
**MATRIX THEORY**
Rank of matrix- Echelon form - -System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

**Suggested Books**:

1. B.S. Grewal, Higher Engineering Mathematics

| | | | |
|---|---|---|---|
| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

*with effect from :2019-20 (R-18)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

## NUMERICAL METHODS, PROBABILITY & STATISTICS

## for B.E., IV- Sem., (CBCS)

*(Civil, EEE & Mechanical only)*

| | | |
|---|---|---|
| Instruction : 3 +1 Hours per week | Sem. End Exam Marks : 60 | Subject Reference Code : U18BS410MA |
| Credits : 3 | Sessional Marks : 40 | Duration of Semester End Exam : 3 Hrs |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students will be able to:*** |
| 1. ***Study*** *the methods to solve algebraic and transcendental equations, apply numerical methods to interpolate.* | 1. ***Solve*** *algebraic and transcendental equations using Bisection method Regula-Falsi, Newton-Rap son and apply numerical methods to interpolate.* |
| 2. ***Understand*** *numerical differentiation and integrate functions and to solve differential equations using numerical methods.* | 2. ***Solve*** *problems using numerical differentiation using interpolation approach and differential equations using numerical methods.* |
| 3. ***Understand*** *Random variables Probability Distributions.* | 3. ***Apply*** *various probability distributions to solve practical problems.* |
| 4. ***Understand*** *tests of hypothesis for large and small samples.* | 4. ***Estimate*** *unknown parameters of populations and apply the tests of hypotheses for large and small samples.* |
| 5. ***Study*** *the method to fit different curves to a given data, how Correlation between variables can be measured.* | 5. ***Solve*** *problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation and to determine regression lines and their applications.* |

**UNIT –I (10 Hours)**

**Interpolation:**

Finite Differences- Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences – Newton's Divided difference formula.

**UNIT –II (10 Hours)**

**Numerical Solutions of ODE:**

Numerical Differentiation -Interpolation approach- Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method - Runge-Kutta Method of $4^{th}$ order(without proofs)

**UNIT-III (10 Hours)**

**Probability:**

Random Variables - Discrete and Continuous Random variables-Properties- Distribution functions and densities - Expectation – Variance – Normal Distribution.

N. Vasudha.
(Chairman, BOS)

**UNIT-IV(12 Hours)**
**Test of Hypothesis:**
Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance – Confidence Intervals-Tests of Significance for small samples - t-test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit – Introduction to Design of experiments.

**UNIT-V (10 Hours)**
**Curve Fitting:**
Curve fitting by the Method of Least Squares - Fitting of Straight line- Regression - Lines of Regression Correlation – Karl Pearson's Co-efficient of Correlation.

**Text Books:**


1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.
3. Probability, Statistics and Random Processes, T. Veerarajan , Tata MCGraw Hill Education Private Ltd.


**Reference Books:**


1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
3. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.


**Online Resources :**

1. **http://tutorial.math.lamar.edu/Classes/DE/DE.aspx**
2. **http://mathworld.wolfram.com/topics**
3. **http://www.nptel.ac.in/course.php**

| (Prof. N. Kishan ) | (Prof. D.Srinivasacharya) | (Prof.A. Ramu) | ( Dr. B Srivathsa ) 18.5.19 |
|---|---|---|---|
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Industry Expert) |

N. Vasudha.
(Dr.N Vasudha)
(Chairman)

*with effect from :2019-20 (R-18)*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

### PROBABILITY & STATISTICS

**for B.E., IV- Sem., (CBCS)**

***(For IT only)***

| | | |
|---|---|---|
| **Instruction** : 3 +1 Hours per week | **Sem. End Exam Marks** : 60 | **Subject Reference Code** : **U18BS420MA** |
| **Credits** : 3 | **Sessional Marks:** 40 | **Duration of Semester End Exam** : 3 Hrs |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| *The course will enable the students to:* | *At the end of the course students will be able to:* |
| 1. **Study** the concepts and application of conditional probability | 1. **Apply** conditional probability to the real world problems |
| 2. **Understand** various concepts of Random variables and standard Statistical Distributions | 2. **Apply** various statistical distributions to solve practical problems,to estimate unknown parameters of populations and apply the tests of hypotheses. |
| 3. **Study** various methods of testing large samples | 3. **Infer** properties of population conducting tests on samples |
| 4. **Analyze** standard statistical tests employed for small samples | 4. **Categorize** population based on tests on small samples |
| 5. **Understand** fitting of a straight line to a given data and measuring Correlation between variables. | 5. **Solve** problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems. |

**UNIT –I (10 Hours)**

**Probability**:

Basic terminology- Definition of Probability – Addition Law of probability- Independent events- Conditional Probability- Multiplication law of probability - Baye's Theorem.

**UNIT –II (12 Hours)**

**Probability Distributions**:

Random Variables - Probability Distribution and Density function for Discrete and Continuous Random variables - Expectation – Variance –Normal Distributions.

**UNIT-III (12 Hours)**

**Tests of Hypothesis for Large samples:**

Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance – Confidence Intervals - One and two tailed tests - Tests of Significance for large samples – Tests for single mean- Difference of means.

N. Vandha.
(Chairman, BOS).

**UNIT-IV (8 Hours)**

**Tests of Hypothesis for Small samples:**

Tests of Significance for small samples - t-test for single mean and difference of means - F- test for comparison of variances - Chi-square test for goodness of fit..

**UNIT-V (10 Hours)**

**Curve Fitting:**

Curve fitting by the Method of Least Squares - Fitting of Straight line - Second degree parabolas – Regression - Lines of Regression - Correlation – Karl Pearson's Co-efficient of Correlation.

**Text Books:**


1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.


**Reference Books:**


1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
3. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.


**Online Resources :**

1. **http://mathworld.wolfram.com/topics**
2. **http://www.nptel.ac.in/course.php**

| | | | |
|---|---|---|---|
| (Prof. N. Kishan ) | (Prof. D.Srinivasacharya) | (Prof.A. Ramu) | ( Dr. B Srivathsa ) |
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Industry Expert) |

18-8-15

(Dr.N Vasudha)
(Chairman)

*with effect from :2021-22*

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
## DEPARTMENT OF MATHEMATICS
## NUMERICAL METHODS (REVISED)
### (Open Elective)
### For B.E., V - Semester – CBCS
### *(for CSE & IT only)*

| | | |
|---|---|---|
| **Instruction : 3 Hours per week** | **Sem. End Exam Marks : 60** | **Subject Reference Code : U19OE510MA** |
| **Credits : 3** | **Sessional Marks : 40** | **Duration of Semester End Exam : 3 Hours** |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| ***The course will enable the students to:*** | ***At the end of the course students will be able to:*** |
| 1. **Study** various numerical methods to solve Algebraic and Transcendental equations.<br>2. **Understand** the methods to solve linear system of equations.<br>3. **Understand** the numerical methods in interpolation and extrapolation.<br>4. **Understand** the numerical methods in interpolation using central differences.<br>5. **Understand** numerical methods in solving ordinary differential equations. | *1.* **Apply** numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods<br>*2.* **Solve** linear system of equations using direct and iteration methods.<br>*3.* **Use** various numerical methods in interpolation and extrapolation.<br>*4.* **Use** various numerical methods in interpolation using central differences.<br>*5.* **Find** numerical solutions of ordinary differential equations. |

**Unit – I: (8 Hours)**

**Solution of Algebraic and Transcendental equations:**

Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

**Unit – II: (8 Hours)**

**Solution of linear system of equations:**

Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method-Ill-conditioned system of equations.

**Unit – III: (8 Hours)**

**Numerical differences-I**

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's divided difference formula.

**Unit – IV: (8 Hours)**

**Numerical differences-II**

Central differences interpolation-Gauss's forwards and backward difference formulae-Stiriling's formula- Bessel's formula.

**Unit – V: (8 Hours)**

## Numerical Solutions of Ordinary Differential Equations

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta Method of $4^{th}$ order (without proofs).

**Text Books:**

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

**Reference Books:**

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

| (Dr. C Goverdhan ) | (Prof. D.Srinivasacharya) | (Prof.M A Srinivas) | (Dr.T Sudhakar Rao) |
|---|---|---|---|
| (OU Nominee) | (Subject Expert -1) | (Subject Expert-2) | (Chairman, BOS) |

*With effect from:* **2019-20**(R-17)

# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

## DEPARTMENT OF MATHEMATICS

## (OPEN ELECTIVE)

## DISCRETE MATHEMATICS AND APPLICATIONS

## for B.E., V- Sem., (CBCS)

## (For Civil, ECE, EEE & MECH only)

| | | |
|---|---|---|
| **Instruction** : 3 Hours per week | **Sem. End Exam Marks** : 60 | **Subject Reference Code** : **U17OE520MA** |
| **Credits** : 3 | **Sessional Marks**: 40 | **Duration of Semester End Exam** : 3 Hrs |

| COURSE OBJECTIVES | COURSE OUTCOMES |
|---|---|
| *The course will enable the students to:* | *At the end of the course students will be able to:* |
| 1. *Understand* Propositions and their equivalences, predicates and quantifiers and learn various proof strategies. | 1. *Use* logical notation to define and reason about fundamental mathematical concepts and synthesize induction hypothesis and simple Induction proofs. |
| 2. *Study* the concepts of number theory such Modular Arithmetic, Congruences and basic cryptography etc., | 2. *Prove* elementary properties of modular arithmetic and basic cryptography and apply in Computer Science. |
| 3. *Understand* the basics of counting, combinatory, and various methods of solving Recurrence relations. | 3. *Calculate* number of possible outcomes of elementary combinatorial processes such as permutations and combinations *Model* and analyze computational processes using analytic and Combinatorial methods. |
| 4. *Understand* Relations, Equivalence relations, Posets and Hasse diagrams. | 4. *Prove* whether a given relation is an equivalence relation/poset and will be able to draw a Hasse diagram. |
| 5. *Analyze* the concepts of Graphs. | 5. *Apply* graph theory models of data structures and to solve problems of connectivity. |

### UNIT – I (10 Hours)

**Logic:** Logic- Logical connectives- Propositional equivalences– Predicates and quantifiers – Nested quantifiers.

**Mathematical Reasoning, Induction:** Proof Strategy- Methods of Proofs- Mathematical Induction- Second Principle of Mathematical Induction.

### UNIT – II (8 Hours)

**Number Theory:** The Integers and Division- Division Algorithm- Fundamental Theorem of Arithmetic –Modular Arithmetic-Integers and Algorithms- Euclidean Algorithm -Linear Congruences- Fermat's Little Theorem.

N. Vasavi

(Chairman, BOS)

**Unit – IV: (8 Hours)**

**Numerical Integration**

Inroduction to Numerical Integration - Boole's Rule – Weddle's Rule – Evaluation of Double Integrals using Numerical Methods – Trapezoidal Rule - Simpson's Rule.

**Unit – V: (8 Hours)**

**Numerical Solutions of Ordinary Differential Equations**

Numerical Solutions of Ordinary Differential Equations: Euler's Method - Modified Euler's Method – Predictor–Corrector methods- Milne's method –Adam's Bashforth method.

**Text Books:**

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

**Reference Books:**

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

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