SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.Tech Part- II

CBCS PATTERN

Syllabus to be implemented from

June, 2019 onwards.

S.Y.B. Tech.(Computer Science and Engineering) - Semester – III

APPLIED MATHEMATICS

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 35 marks**
Tutorial : 1 hour/week	**Online Exam : 35 marks**
Credits : 4	**CIE : 30 marks**
	Term Work : 25 marks

Course Objectives:

1) To develop mathematical skills and enhance thinking power of students.
2) To give the knowledge to the students of fuzzy set theory, numerical methods probability and statistics with an emphasis on the application of solving engineering problems
3) To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Describe the statistical data numerically by using Lines of regression and Curve fittings.
2) Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
3) Calculate numerical Integration.
4) Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.
5) Solve examples on the principle in performing fuzzy number arithmetic operations such as Addition, Multiplication & fuzzy equation.
6) Solve assignment problems by using different techniques of operation research.

SECTION – I

Unit 1. Correlation, Regression & Curve Fitting: **07**

1.1 Introduction.
1.2 Karl Pearson's Coefficient of Correlation.
1.3 Lines of regression of bivariate data.
1.4 Fitting of Curves by method of Least-squares:
  1.4.1 Fitting of Straight lines.
  1.4.2 Fitting of exponential curves.
  1.4.3 Fitting of second degree Parabolic curves.

Unit 2. Probability Distribution: **07**

2.1 Random variables.
2.2 Discrete Probability distribution.
2.3 Continuous probability distribution.
2.4 Binomial Distribution.
2.5 Poisson Distribution.
2.6 Normal Distribution.

07

Unit 3. Numerical Integration:
3.1 Newton Cotes formulae.
3.2 Trapezoidal Rule.
3.3 Simpson's 1/3 rd rule.
3.4 Simpson's 3/8 th rule.
3.5 Weddle's Rule.

SECTION – II

Unit 4. Introduction to Fuzzy sets: **07**
4.1 Crisp set and Fuzzy set.
4.2. Basic concepts of fuzzy sets.
4.3 Basic operations on fuzzy sets.
4.4 Properties of fuzzy sets.

Unit 5. Fuzzy Arithmetic: **07**
5.1 Fuzzy numbers.
5.2 Fuzzy cardinality.
5.3 Arithmetic Operations on Fuzzy numbers.
5.4 Solutions of Fuzzy equations of type $A + X = B$ and $A.X = B$.

Unit 6. Assignment Problem: **07**
6.1 Definition, Balanced and Unbalanced assignment problem.
6.2 Hungarian Method.
6.3 Balanced assignment problems.
6.4 Unbalanced assignment problems.
6.5 Traveling salesmen problem.

Reference Books:

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India).
2) Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning)
3) Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press).
4) Engineering Mathematics by V. Sundaram (Vikas Publication).
5) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi).
6) Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill).
7) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication).
8) Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited).
9) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:
1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2) Number of assignments should be at least six (All units should be covered).

S.Y.B. Tech. (ELECTRONICS) Semester-III

ENGINEERING MATHEMATICS-III

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1) To develop mathematical skills and enhance thinking power of students.
2) To give the knowledge to the students of fuzzy set theory, Linear Differential Equations probability ,Laplace transforms ,Fourier series with an emphasis on the application of solving engineering problems
3) To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Make use of Linear Differential Equations to solve the Electrical Engineering problems.
2) Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.
3) Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.
4) Develop Fourier series expansion of a function over the given interval.
5) Find Laplace transforms of given functions and use it to solve linear differential equations.
6) Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.

SECTION – I

Unit 1. Linear Differential Equations (LDE) and its Applications: **07**

1.1 Linear Differential equations with constant coefficients.
1.2 Rules to find complementary function.
1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)
1.4 Cauchy's homogeneous linear differential equations.
1.5 Applications of linear differential equations with constant coefficients to Electrical engineering.

Unit 2. Vector Differential Calculus: 07

2.1 Differentiation of vectors.
2.2 Gradient of scalar point function.
2.3 Directional derivative.
2.4 Divergence of vector point function.
2.5 Curl of a vector point function.
2.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

07

Unit 3. Introduction to Fuzzy sets:

3.1 Crisp set and Fuzzy set.
3.2. Basic concepts of fuzzy sets
3.3 Basic operations on fuzzy sets.
3.4 Properties of fuzzy sets.

SECTION – II

Unit 4. Fourier Series: 07

4.1 Introduction.
4.2 Definition, Euler's formulae.
4.3 Dirichlet's conditions.
4.4 Change of interval.
4.5 Expansions of odd and even functions.
4.6 Half range series.

Unit 5. Laplace Transform and its Applications: **07**

5.1 Laplace transform of elementary functions.
5.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication & Division by t).
5.3 Laplace transforms of derivatives and integral.
5.4 Inverse Laplace transforms by partial fractions & convolution theorem.
5.5 Solution of Linear differential equation with constant coefficients using Laplace transform.

Unit 6. Probability Distribution: 07

6.1 Random variables.
6.2 Discrete Probability distribution.
6.3 Continuous probability distribution.
6.4 Binomial Distribution.
6.5 Poisson Distribution.
6.6 Normal Distribution.

Reference Books:

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3) Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4) Engineering Mathematics by V. Sundaram (Vikas Publication.)
5) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6) Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
8) Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited.
9) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2) Number of assignments should be at least six (All units should be covered)

S.Y.B. Tech. (ELECTRONICS AND TELECOMMUNICATION) Semester-III

ENGINEERING MATHEMATICS-III

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of fuzzy set theory, Linear Differential Equations probability ,Laplace transforms ,Fourier series with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1)Make use of Linear Differential Equations to solve the Electrical Engineering problems.

2)Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.

3)Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.

4)Develop Fourier series expansion of a function over the given interval.

5)Find Laplace transforms of given functions and use it to solve linear differential equations.

6)Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.

SECTION – I

Unit 1. Linear Differential Equations (LDE) and its Applications: **07**

1.1 Linear Differential equations with constant coefficients.

1.2 Rules to find complementary function.

1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)

1.4 Cauchy's homogeneous linear differential equations.

1.5 Applications of linear differential equations with constant coefficients to Electrical engineering.

Unit 2. Vector Differential Calculus: 07

2.1 Differentiation of vectors.

2.2 Gradient of scalar point function.

2.3 Directional derivative.

2.4 Divergence of vector point function.

2.5 Curl of a vector point function.

2.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

07

Unit 3. Introduction to Fuzzy sets:

3.1 Crisp set and Fuzzy set.
3.2. Basic concepts of fuzzy sets
3.3 Basic operations on fuzzy sets.
3.4 Properties of fuzzy sets.

SECTION – II

Unit 4. Fourier Series: 07

4.1 Introduction.
4.2 Definition, Euler's formulae.
4.3 Dirichlet's conditions.
4.4 Change of interval.
4.5 Expansions of odd and even functions.
4.6 Half range series.

Unit 5. Laplace Transform and its Applications: **07**

5.1 Laplace transform of elementary functions.
5.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication & Division by t).
5.3 Laplace transforms of derivatives and integral.
5.4 Inverse Laplace transforms by partial fractions & convolution theorem.
5.5 Solution of Linear differential equation with constant coefficients using Laplace transform.

Unit 6. Probability Distribution: 07

6.1 Random variables.
6.2 Discrete Probability distribution.
6.3 Continuous probability distribution.
6.4 Binomial Distribution.
6.5 Poisson Distribution.
6.6 Normal Distribution.

Reference Books:

1)Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2)Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3)Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4)Engineering Mathematics by V. Sundaram (Vikas Publication.)
5)Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6)Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7)Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
9)Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited.
10) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

1)Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)

General Instructions:

1)For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2)Number of assignments should be at least six (All units should be covered).

S.Y.B. Tech. (ELECTRICAL) Semester-III

ENGINEERING MATHEMATICS-III

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of fuzzy set theory, Linear Differential Equations probability ,Laplace transforms ,Fourier series with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1)Make use of Linear Differential Equations to solve the Electrical Engineering problems.

2)Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.

3)Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.

4)Develop Fourier series expansion of a function over the given interval.

5)Find Laplace transforms of given functions and use it to solve linear differential equations.

6)Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.

SECTION – I

Unit 1. Linear Differential Equations (LDE) and its Applications: **07**

1.1 Linear Differential equations with constant coefficients.

1.2 Rules to find complementary function.

1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)

1.4 Cauchy's homogeneous linear differential equations.

1.5 Applications of linear differential equations with constant coefficients to Electrical engineering.

Unit 2. Vector Differential Calculus: 07

2.1 Differentiation of vectors.

2.2 Gradient of scalar point function.

2.3 Directional derivative.

2.4 Divergence of vector point function.

2.5 Curl of a vector point function.

2.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

07

Unit 3. Introduction to Fuzzy sets:

3.1 Crisp set and Fuzzy set.
3.2. Basic concepts of fuzzy sets
3.3 Basic operations on fuzzy sets.
3.4 Properties of fuzzy sets.

SECTION – II

Unit 4. Fourier Series: 07

4.1 Introduction.
4.2 Definition, Euler's formulae.
4.3 Dirichlet's conditions.
4.4 Change of interval.
4.5 Expansions of odd and even functions.
4.6 Half range series.

Unit 5. Laplace Transform and its Applications: **07**

5.1 Laplace transform of elementary functions.
5.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication & Division by t).
5.3 Laplace transforms of derivatives and integral.
5.4 Inverse Laplace transforms by partial fractions & convolution theorem.
5.5 Solution of Linear differential equation with constant coefficients using Laplace transform.

Unit 6. Probability Distribution: 07

6.1 Random variables.
6.2 Discrete Probability distribution.
6.3 Continuous probability distribution.
6.4 Binomial Distribution.
6.5 Poisson Distribution.
6.6 Normal Distribution.

Reference Books:

1)Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2)Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3)Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4)Engineering Mathematics by V. Sundaram (Vikas Publication.)
5)Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6)Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7)Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
9)Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited.
10) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1)For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2)Number of assignments should be at least six (All units should be covered).

S.Y.B. Tech. (Information Technology)- Semester – III

Statistics and Fuzzy Systems

Teaching Scheme	Examination Scheme
Lectures : 4 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 5	**Term Work : 25 marks**

Course Objectives:

1) To develop mathematical skills and enhance thinking power of students.
2) To give the knowledge to the students of fuzzy set theory, numerical methods probability and statistics with an emphasis on the application of solving engineering problems
3) To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Describe the statistical data numerically by using Lines of regression and Curve fittings.
2) Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
3) Calculate numerical Integration.
4) Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.
5) Solve examples on the principle in performing fuzzy number arithmetic operations such as Addition, Multiplication & fuzzy equation.
6) Solve transportation & assignment problems by using different techniques of operation research.

SECTION – I

Unit 1. Correlation, Regression & Curve Fitting: 09

1.1 Introduction.
1.2 Karl Pearson's Coefficient of Correlation.
1.3 Lines of regression of bivariate data.
1.4 Fitting of Curves by method of Least-squares:
  1.4.1 Fitting of Straight lines.
  1.4.2 Fitting of exponential curves.
  1.4.3 Fitting of second degree Parabolic curves.

Unit 2. Probability Distribution: 10

2.1 Random variables.
2.2 Discrete Probability distribution.
2.3 Continuous probability distribution.
2.4 Binomial Distribution.
2.5 Poisson Distribution.
2.6 Normal Distribution.

Unit 3. Numerical Integration: **09**

3.1 Newton Cotes formulae.
3.2 Trapezoidal Rule.
3.3 Simpson's 1/3 rd rule.
3.4 Simpson's 3/8 th rule.
3.5 Weddle's Rule.

SECTION – II

Unit 4. Introduction to Fuzzy sets: **09**

4.1 Crisp set and Fuzzy set.
4.2. Basic concepts of fuzzy sets.
4.3 Basic operations on fuzzy sets.
4.4 Properties of fuzzy sets.

Unit 5. Fuzzy Arithmetic: **09**

5.1 Fuzzy numbers.
5.2 Fuzzy cardinality.
5.3 Arithmetic Operations on Fuzzy numbers.

Unit 6. Transportation and Assignment Problems: **10**

6.1 Definition, balanced and unbalanced transportation problem.
6.2 Least cost and VAM methods of Initial solution.
6.3 UV method of optimum solution.
6.4, Balanced and Unbalanced assignment problems.
6.5 Hungarian method to solve assignment problems.
6.6 Traveling salesmen problem.

Reference Books:

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3) Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4) Engineering Mathematics by V. Sundaram (Vikas Publication.)
5) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6) Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
8) Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited.
9) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2) Number of assignments should be at least six (All units should be covered).

S.Y.B. Tech. (MECHANICAL ENGINEERING)- Semester – III
ENGINEERING MATHEMATICS-III

Teaching Scheme	**Examination Scheme**
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of Statistics, Linear Differential Equations ,Vector Differential Calculus ,Laplace transforms ,Fourier series with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Solve Linear Differential Equations with constant coefficients.
2) Describe the statistical data numerically by using Lines of regression and Curve fittings.
3) Find Laplace transforms of given functions and use it to solve linear differential equations.
4) Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.
5) Develop Fourier series expansion of a function over the given interval.
6) Make use of Partial Differential Equation to solve the Mechanical Engineering problems.

SECTION – I

Unit 1. Linear Differential Equations: **07**

1.1 Linear Differential equations with constant coefficients.
1.2 Rules to find complementary function.
1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)
1.4 Cauchy's homogeneous linear differential equations.

Unit 2. Correlation, Regression & Curve Fitting: 07

2.1 Introduction.
2.2 Karl Pearson's Coefficient of Correlation.
2.3 Lines of regression of bivariate data.
2.4 Fitting of Curves by method of Least-squares:
- 2.4.1 Fitting of Straight lines.
- 2.4.2 Fitting of exponential curves.
- 2.4.3 Fitting of second degree Parabolic curves.

Unit 3. Laplace Transform and its Applications: 07

3.1 Laplace transform of elementary functions.
3.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication & Division by t).
3.3 Laplace transforms of derivatives and integral.
3.4 Inverse Laplace transforms by partial fractions & convolution theorem.
3.5 Solution of Linear differential equation with constant coefficients using Laplace transform.

SECTION – II

Unit 4. Vector Differential Calculus: 06

4.1 Differentiation of vectors.
4.2 Gradient of scalar point function.
4.3 Directional derivative.
4.4 Divergence of vector point function.
4.5 Curl of a vector point function.
4.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

Unit 5. Fourier Series: **06**

5.1 Introduction
5.2 Definition, Euler's formulae.
5.3 Dirichlet's conditions.
5.4 Change of interval.
5.5 Expansions of odd and even functions.
5.6 Half range series.

Unit 6 Partial Differential Equations and Applications: 09

6.1 Formation of partial differential equation
6.2 Method of separation of variables.
6.3 Wave Equation and its solution
6.4 One dimensional heat flow equation
6.5 Solutions of Laplace equations by the Gauss – Seidel iterative method

Reference Books:

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3) Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4) Engineering Mathematics by V. Sundaram (Vikas Publication.)
5) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6) Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
8) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2) Number of assignments should be at least six (All units should be covered).

S.Y.B. Tech. (PRODUCTION ENGINEERING)- Semester – III

ENGINEERING MATHEMATICS-III

Teaching Scheme	**Examination Scheme**
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of Statistics, Linear Differential Equations ,Vector Differential Calculus ,Laplace transforms ,Fourier series with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Solve Linear Differential Equations with constant coefficients.

2)Describe the statistical data numerically by using Lines of regression and Curve fittings.

3)Find Laplace transforms of given functions and use it to solve linear differential equations.

4)Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.

5)Develop Fourier series expansion of a function over the given interval.

6)Make use of Partial Differential Equation to solve the Mechanical Engineering problems.

SECTION – I

Unit 1. Linear Differential Equations: **07**

1.1 Linear Differential equations with constant coefficients.
1.2 Rules to find complementary function.
1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)
1.4 Cauchy's homogeneous linear differential equations.

Unit 2. Correlation, Regression & Curve Fitting: 07

2.1 Introduction.
2.2 Karl Pearson's Coefficient of Correlation.
2.3 Lines of regression of bivariate data.
2.4 Fitting of Curves by method of Least-squares:
  2.4.1 Fitting of Straight lines.
  2.4.2 Fitting of exponential curves.
  2.4.3 Fitting of second degree Parabolic curves.

07

Unit 3. Laplace Transform and its Applications:

3.1 Laplace transform of elementary functions.
3.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication & Division by t).
3.3 Laplace transforms of derivatives and integral.
3.4 Inverse Laplace transforms by partial fractions & convolution theorem.
3.5 Solution of Linear differential equation with constant coefficients using Laplace transform.

SECTION – II

Unit 4. Vector Differential Calculus: 06

4.1 Differentiation of vectors.
4.2 Gradient of scalar point function.
4.3 Directional derivative.
4.4 Divergence of vector point function.
4.5 Curl of a vector point function.
4.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

Unit 5. Fourier Series: **06**

5.1 Introduction
5.2 Definition, Euler's formulae.
5.3 Dirichlet's conditions.
5.4 Change of interval.
5.5 Expansions of odd and even functions.
5.6 Half range series.

Unit 6 Partial Differential Equations and Applications: 09

6.1 Formation of partial differential equation
6.2 Method of separation of variables.
6.3 Wave Equation and its solution
6.4 One dimensional heat flow equation
6.5 Solutions of Laplace equations by the Gauss – Seidel iterative method

Reference Books:

1)Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2)Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3)Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4)Engineering Mathematics by V. Sundaram (Vikas Publication.)
5)Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6)Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7)Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
8)Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1)For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2)Number of assignments should be at least six (All units should be covered).

S.Y.B. Tech. (CIVIL ENGINEERING)- Semester – III
ENGINEERING MATHEMATICS-III

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of Statistics, Linear Differential Equations ,Vector Differential Calculus ,Laplace transforms ,Probability, Numerical Integration with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Make use of Linear Differential Equations to solve the Civil Engineering problems.
2) Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.
3) Describe the statistical data numerically by using Lines of regression and Curve fittings.
4) Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
5) Find Laplace transforms of given functions and use it to solve linear differential equations.
6) Calculate numerical Integration.

SECTION – I

Unit 1. Linear Differential Equations (LDE) and its Applications: **08**

1.1 Linear Differential equations with constant coefficients.
1.2 Rules to find complementary function.
1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)
1.4 Cauchy's homogeneous linear differential equations.
1.5 Applications of Linear Differential Equations to Cantilever , Strut , Beam.

Unit 2. Vector Differential Calculus: 07

2.1 Differentiation of vectors.
2.2 Gradient of scalar point function.
2.3 Directional derivative.
2.4 Divergence of vector point function.
2.5 Curl of a vector point function.
2.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

07

Unit 3. Correlation, Regression & Curve Fitting:

3.1 Introduction.
3.2 Karl Pearson's Coefficient of Correlation.
3.3 Lines of regression of bivariate data.
3.4 Fitting of Curves by method of Least-squares:
  3.4.1 Fitting of Straight lines.
  3.4.2 Fitting of exponential curves.
  3.4.3 Fitting of second degree Parabolic curves.

SECTION – II

Unit 4. Probability Distribution: 06

4.1 Random variables.
4.2 Discrete Probability distribution.
4.3 Continuous probability distribution.
4.4 Binomial Distribution.
4.5 Poisson Distribution.
4.6 Normal Distribution.

Unit 5. Laplace Transform and its Applications: **07**

5.1 Laplace transform of elementary functions
5.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication & Division by t)
5.3 Laplace transforms of derivatives and integral.
5.4 Inverse Laplace transforms by partial fractions & convolution theorem.
5.5 Solution of Linear differential equation with constant coefficients using Laplace transform

Unit 6. Numerical Integration: 07

6.1 Newton Cotes formulae
6.2 Trapezoidal Rule.
6.3 Simpson's 1/3 rd rule.
6.4 Simpson's 3/8 th rule.
6.5 Weddle's Rule.

Reference Books:

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3) Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4) Engineering Mathematics by V. Sundaram (Vikas Publication.)
5) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6) Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
8) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.

S.Y.B. Tech. (CHEMICAL ENGINEERING)- Semester – III

ENGINEERING MATHEMATICS-III

Teaching Scheme	**Examination Scheme**
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of Statistics, Linear Differential Equations ,Laplace transforms ,Probability, with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Solve Linear Differential Equations with constant coefficients.
2) Make use of linear Differential Equation to **solve** the Chemical Engineering problems.
3) Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
4) Find Laplace transforms of given functions
5) Apply Laplace transforms to solve Linear Differential Equations
6) Describe the statistical data numerically by using Lines of regression and Curve fittings.

SECTION – I

Unit 1. Linear Differential Equations **07**

1.1 Linear Differential equations with constant coefficients.
1.2 Rules to find complementary function.
1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)
1.4 System of simultaneous Linear differential with constant coefficients.

Unit 2 Application to Linear differential equations: 07

2.1 Chemical reactions and solutions (mixture problems).
2.2 Conduction of heat.
2.3 Chemical Reactions-Law of mass action

Unit 3. Probability Distribution: 07

3.1 Random variables.
3.2 Discrete Probability distribution.
3.3 Continuous probability distribution.
3.4 Binomial Distribution.
3.5 Poisson Distribution.
3.6 Normal Distribution.

SECTION – II

Unit 4. Laplace Transformation 07

4.1 Laplace transform of elementary functions
4.2 Properties of Laplace transforms
  4.2.1Linearity Property
  4.2.2 First Shifting property
  4.2.3 Change of scale property
4.3 Laplace transforms of derivatives and integral.
4.4 Multiplication by t^n and division by t
4.5 Evaluation of integrals by Laplace transform.

Unit 5. Inverse Laplace Transform: **07**

5.1 Definition and important formulae
5.2 First shifting property
5.3 Inverse Laplace transform by method of partial fraction
5.4 Convolution theorem (without proof)
5.5 Inverse Laplace transform of derivatives
5.6 Solution of Linear differential equation with constant coefficients using Laplace transform

Unit 6. Correlation, Regression & Curve Fitting: 07

6.1 Introduction.
6.2 Lines of regression of bivariate data.
6.3 Fitting of Curves by method of Least-squares:
  6.3.1 Fitting of Straight lines.
  6.3.2 Fitting of exponential curves.
  6.3.3 Fitting of second degree Parabolic curves.

Text Book

1) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)

Reference Books

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
3) Differential Equations and Their applications, by Zafar Ahsan (Prentice-Hall of India PVT)
4) A text book of Applied Mathematics: Vol. I, II and III by J. N. Wartikar & P. N. Wartikar, Vidyarthi Griha Prakashan, Pune.

General Instructions:

1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2) Number of assignments should be at least six (All units should be covered).
3) Case studies are to be covered based on chemical engineering.

S.Y.B. Tech. (CHEMICAL ENGINEERING)- Semester – IV

ENGINEERING MATHEMATICS-IV

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : --	**CIE : 30 marks**
Credits : 3	**Term Work : --**

Course Objectives:

1)To develop mathematical skills and enhance thinking power of students.

2)To give the knowledge to the students of Vector Differential Calculus, 2 Partial Differential Equations, Numerical Differentiation, Fourier Series, with an emphasis on the application of solving engineering problems

3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1) Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.
2) Form and solve partial differential equations
3) Find values of first, second and third derivative at a particular point
4) Calculate numerical Integration.
5) Develop Fourier series expansion of a function over the given interval.
6) Make use of Partial Differential Equation to solve the Mechanical Engineering problems.

SECTION – I

Unit 1. Vector Differential Calculus: 07

1.1 Differentiation of vectors.
1.2 Gradient of scalar point function.
1.3 Directional derivative.
1.4 Divergence of vector point function.
1.5 Curl of a vector point function.
1.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

Unit 2 Partial Differential Equations: 07

2.1 Formation of partial differential equation.
2.2 Lagranges method to solve first order linear partial differential equations of the form
2.3. Standard method to solve first order non-linear partial differential equations of the
2.3.1 Form I $f(p,q)=0$
2.3.2 form II $f(z,p,q)=0$
2.3.3 form III $f(x,p)=g(y,q)$
2.3.4 Clairauts form $z= px+qy+f(p,q)$

Unit 3: Numerical Differentiation 07

3.1 Definition

3.2 Numerical differential by using

3.2.1 Newton's forward difference interpolation formula

3.2.2 Newton's backward difference interpolation formula

3.2.3 Sterling's central difference interpolation formula

3.2.4 Newton's divided difference formula

SECTION – II

Unit 4. Numerical Integration: 06

4.1 Newton Cotes formulae

4.2 Trapezoidal Rule.

4.3 Simpson's 1/3 rd rule.

4.4 Simpson's 3/8 th rule.

4.5 Weddle's Rule.

Unit 5. Fourier Series: **07**

5.1 Introduction

5.2 Definition, Euler's formulae.

5.3 Dirichlet's conditions.

5.4 Change of interval.

5.5 Expansions of odd and even functions.

5.6 Half range series.

Unit 6 Partial Differential Equations and Applications: 08

6.1 Formation of partial differential equation

6.2 Method of separation of variables.

6.3 Wave Equation and its solution

6.4 One dimensional heat flow equation

6.5 Solutions of Laplace equations by the Gauss – Seidel iterative method

Text Book

1) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)

Reference Books

1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
3) Numerical Methods in Engineering and Science, by Dr. B. S. Grewal (Khanna Publication, Delhi)
4) A text book of Applied Mathematics: Vol. I, II and III by J. N. Wartikar & P. N. Wartikar, Vidyarthi Griha Prakashan, Pune.

General Instructions:

1) Case studies are to be covered based on chemical engineering.