Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal
MA….. DEPARTMENTAL MATHEMATICS 3 - 1 - 0

(Proposed Syllabus for M-III (BE III or IV sem) CE/TX Branches)

COURSE OBJECTIVE- The objective of this course is to fulfill the needs of Engineers to understand the Applications of Fourier Series, Different Transforms, Complex Analysis & Numerical Solution of Ordinary & Partial Differential Equations in order to enable young technocrats to acquire Mathematical thinking of Formulating, Analyzing and Solving a wide range of Practical Problems Appearing in Science & Engineering.

Course Contents (Proposed)

Fourier Series: Fourier Series for Continuous & Discontinuous Functions, Expansion of odd and even periodic functions, Half range Fourier series, Complex form of Fourier Series, Parseval's formula.

Fourier Transform: Complex Fourier Transform, Fourier Sine and Cosine Transforms.

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary Functions, Properties of Laplace Transform, Change of Scale Property, First and Second Shifting Properties, Laplace Transform of Derivatives and Integrals. Inverse Laplace Transform & its Properties, Convolution theorem, Applications of Laplace Transform in solving the Ordinary Differential Equations.

Functions of Complex Variables : Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem , Application of Residues theorem for Evaluation of Real Integrals.

Solution of Ordinary Differential equations: Picard's, Taylor's Series, Eulers's, Modified Eulers's, Runge-Kutta, Milne's and Adam's Bashforth Method; **Numerical Solution of Difference Equations:** Classification of Partial Differential Equations. Numerical Solution of Elliptic , Parabolic & Hyperbolic Equations.

COURSE OUTCOMES- The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of Fourier Series, Different Transforms, Complex Analysis & & Numerical Solution of Ordinary & Partial Differential Equations.

EVALUATION- Evaluation will be continuous an integral part of the class as well through external assessment.

References:
1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India.
2. B.S. Grewal: Higher Engineering Mathematics , Khanna Publication.

3. Engineering Mathematics By Samnta Pal and Bhutia, Oxford Publication
4. Ramana: Advance Engg. Mathematics, TMH New Delhi
5. Numerical Methods for Engineers by Steven C. Chapra, McGraw Hill Education
6. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
7. Numerical Methods By Shrimanta Pal, Oxford

(Proposed Syllabus for M-III(BE III or IV sem) CS/IT Branches)

COURSE OBJECTIVE- The objective of this course is to fulfill the needs of Engineers to understand the Applications of Fourier Series, Fourier & Laplace Transforms and Statistical Techniques in order to acquire Mathematical knowledge and to Solving a wide range of Practical Problems Appearing in the CS/IT/BT discipline of Engineering.

Course Contents (Proposed)

Fourier Series: Fourier Series for Continuous & Discontinuous Functions, Expansion of odd and even periodic functions, Half range Fourier series, Complex form of Fourier Series, Parseval's formula.

Fourier Transform: Complex Fourier Transform, Fourier Sine and Cosine Transforms.

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary Functions, Properties of Laplace Transform, Change of Scale Property, First and Second Shifting Properties, Laplace Transform of Derivatives and Integrals. Inverse Laplace Transform & its Properties, Convolution theorem, Applications of Laplace Transform in solving the Ordinary Differential Equations.

Random Variables: Discrete and Continuous , Probability Function, Distribution Function, Density Function, Probability Distribution, Mean and Variance.

Distribution: Discrete Distributions- Binomial & Poisson Distributions with their Constants, Moment Generating Functions, Expected Frequiencies & Fittings, Continuous Distribution- Normal or Gaussian Distribution with normal curve, Properties, Constants, Moments, Method of Area of Fitting a normal distribution & Exponential Distribution.

COURSE OUTCOMES- The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of Applications of Fourier Series, Fourier & Laplace Transforms and Statistical Techniques.

EVALUATION- Evaluation will be continuous an integral part of the class as well through external assessment

Reference:

1. Probability & Statistics by G Shanker Rao, University Press.
2. Mathematical Statistics by George R., Springer
3. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India.
4. H C Taneja: Advanced Engineering Mathematics, I.K. International Publishing House Pvt. Ltd.
5. S S Sastri: Engineering Mathematics, PHI
6. Ramana: Advance Engg. Mathematics,   TMH New Delhi
7. Engineering Mathematics By Samnta Pal and Bhutia, Oxford Publication

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MA…..   DEPARTMENTAL MATHEMATICS   3 - 1 - 0

(Proposed Syllabus for M-III(BE III or IV sem) EC/EX/EE/EI/BM Branches)

COURSE OBJECTIVE- The objective of this course is to fulfill the needs of Engineers to understand the Applications of Fourier Series, Different Transforms, Complex Analysis & Vector Calculus in order to enable young technocrats to acquire Mathematical thinking of Formulating, Analyzing and Solving a wide range of Practical Problems Appearing in Science & EC/EX/EE/EI/IC/BM Engineering.

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Functions of Complex Variables : Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem , Application of Residues theorem for Evaluation of Real Integrals.

Vector Calculus: Differentiation of Vectors, Scalar and Vector Point functions, Gradient, Directional derivative, Divergence and Curl. Line Integral, Surface Integral and Volume Integral, Stoke's Theorem and Gauss divergence theorem.

COURSE OUTCOMES- The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of Fourier Series, Different Transforms, Complex Analysis & Vector Calculus.

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1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India.
2. H C Taneja: Advanced Engineering Mathematics, I.K. International Publishing House Pvt. Ltd.
3. C B Gupta & S R Singh : Engineering Mathematics , Mc Graw Hill Education.
4. S S Sastri: Engineering Mathematics, PHI
5. Ramana: Advance Engg. Mathematics,   TMH New Delhi
6. Engineering Mathematics By Samnta Pal and Bhutia, Oxford Publication

(Proposed Syllabus for M-III(BE III or IV sem) ME/AU/CM/FT/IP/MI Branches)

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Course Contents (Proposed)

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