K L UNIVERSITY

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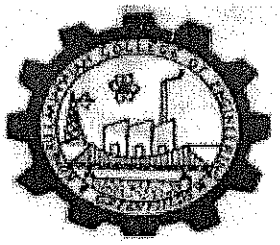
Department of Mathematics & Computing



Minutes of the
First Board of Studies Meeting

COR-NSM-STD-REC-1	Standard for issuing the Notices for BOS meetings

Meeting Particulars

Type of Meeting	**Board of Studies,**
Department Conducting the meeting	Department of Mathematics and Computing
Number of the Meeting	01
Date of Meeting	07-04-2012
Time of Meeting	9 :00 am
Venue of Meeting	FED conference hall, K.L.University

Persons to Meet

Serial Number	Name of the Person	Institution	Department of the Person	Designation of the person	Position of the person in the meeting	Primary Responsibility if any
1	Dr.V.Vasanta Kumar	K L University	Dept.of Mathematics & Computing	Professor	Chairmen	To Recommend the Syllabus for Mathematics Courses and recommend the course structure for M.Sc Applied Mathematics
2	Dr.Y.V.S.S.Sanyasiraju	IIT Madras	Dept.of Mathematics	Professor	External Member	-do-
3	Dr.V.Uma Maheswara Rao	Andhra University	Dept.of Applied Mathematics	Professor	External Member	-do-
4	Dr.V.S.Bhagavan	K L University	Dept.of Mathematics & Computing	Professor	Internal Member	-do-
5	Dr.B.V.Appa Rao	K L University	Dept.of Mathematics & Computing	Associate Professor	Internal Member	-do-
6	Dr.A.S.N.Murthy	K L University	Dept.of Mathematics & Computing	Associate Professor	Internal Member	-do-

Agenda Items to Discuss.

Item Number	Agenda Item
MATH-BOS-1201	To recommend the syllabus of Probability Statistics course (12-BS201) for II/IV B.Tech.
MATH-BOS-1202	To recommend the syllabus of mathematical models (12-BS202) for II/IV B.Tech (ME)
MATH-BOS-1203	To recommend the syllabus of Mathematical Methods for Computing course (12-BS203) for II/IV B.Tech (CSE & ECM)
MATH-BOS-1204	To recommend the syllabus of Numerical Methods & transforms course (12-BS204) for II/IV B.Tech (EEE)
MATH-BOS-1205	To recommend the syllabus of Numerical Methods & Partial differential equations course (12-BS205) for II/IV B.Tech (ECE)
MATH-BOS-1206	To recommend the syllabus of Numerical & Finite elements Methods course (12-BS206) for II/IV B.Tech (CE)
MATH-BOS-1207	To recommend the introduction of Ph.D programmes in the areas : Special Functions, Boundary Value Problems, Fluid Dynamics, Fuzzy Sets, Queueing Theory and Transportation Problems .
MATH-BOS-1208	To recommend the course structure for M.Sc Applied Mathematics as per Annexure - I

Notice Acknowledgement

Serial Number	Name	Designation	Institutions	Signature
1.	Dr.V.Vasanta Kumar	Professor	K L University	
2.	Dr.Y.V.S.S.Sanyasiraju	Professor	IIT Madras	
3.	Dr.V.Uma Maheswara Rao	Professor	Andhra University	
4.	Dr.V.S.Bhagavan	Professor	K L University	
5.	Dr.B.V.Appa Rao	Associate Professor	K L University	
6.	Dr.A.S.N.Murthy	Assistant Professor	K L University	

Authorized Signatory: **Signature:**

COR-NSM-STD-REC-2	Standard for recording the minutes of the Meetings

Particulars of the Meeting conducted

Type of Meeting	**Board of Studies,**
Department Conducting the meeting	Department of Mathematics and Computing
Number of the Meeting	01
Date of Meeting	07-04-2012
Time of Meeting	9 :00 am
Venue of Meeting	FED conference hall, K.L.University

Persons Present

Serial Number	Name of the Person	Institution	Department of the Person	Designation of the person	Position of the person in the meeting	Primary Responsibility if any
1	Dr.V.Vasanta Kumar	K L University	Dept.of Mathematics & Computing	Professor	Chairmen	To Recommend the Syllabus for Mathematics Courses and recommend the course structure for M.Sc Applied Mathematics
2	Dr.Y.V.S.S.Sanyasiraju	IIT Madras	Dept.of Mathematics	Professor	External Member	-do-
3	Dr.V.Uma Maheswara Rao	Andhra University	Dept.of Applied Mathematics	Professor	External Member	-do-
4	Dr.V.S.Bhagavan	K L University	Dept.of Mathematics & Computing	Professor	Internal Member	-do-
5	Dr.B.V.Appa Rao	K L University	Dept.of Mathematics & Computing	Associate Professor	Internal Member	-do-
6	Dr.A.S.N.Murthy	K L University	Dept.of Mathematics & Computing	Associate Professor	Internal Member	-do-

	Mathematics : Special Functions, Boundary Value Problems, Fluid Dynamics, Fuzzy Sets, Operations Research etc.		resolved that the syllabus is recommended for approval	
MATH-BOS-1208	To recommend the course structure for M.Sc Applied Mathematics as per Annexure - I		It has been resolved that the syllabus is recommended for approval	

Circulation and acknowledgements

Serial Number	Name	Designation	Institutions	Signature
1	Dr.V.Vasanta Kumar	Professor	K L University	
2	Dr.Y.V.S.S.Sanyasiraju	Professor	IIT, Madras	
3	Dr.V.Uma Maheswara Rao	Professor	Andhra University	
4	Dr.V.S.Bhagavan	Professor	K L University	
5	Dr.B.V.Appa Rao	Associate Professor	K L University	
6	Dr.A.S.N.Murthy	Assistant Professor	K L University	

Authorized Signatory: **Signature:**

Resolutions

Agenda Item Number	Agenda Item Description	Important Objections	Resolution	Feedback Reference if any
MATH-BOS-1201	To recommend the syllabus of Probability Statistics course (12-BS201) for II/IV B.Tech.		It has been resolved that the syllabus is recommended for approval	DEP-ACC-YRSRL
MATH-BOS-1202	To recommend the syllabus of mathematical models (12-BS202) for II/IV B.Tech (ME)		It has been resolved that the syllabus is recommended for approval	
MATH-BOS-1203	To recommend the syllabus of Mathematical Methods for Computing course (12-BS203) for II/IV B.Tech (CSE & ECM)		It has been resolved that the syllabus is recommended for approval	
MATH-BOS-1204	To recommend the syllabus of Numerical Methods & transforms course (12-BS204) for II/IV B.Tech (EEE)	Wavelet transforms is not recommended in this course	It has been resolved that the modified syllabus is recommended for approval	
MATH-BOS-1205	To recommend the syllabus of Partial differential equations and Numerical Methods course (12-BS205) for II/IV B.Tech (ECE)	Classification of second order PDEs is recommended for inclusion	It has been resolved that the modified syllabus is recommended for approval	
MATH-BOS-1206	To recommend the syllabus of Partial differential equations and Numerical Methods course (12-BS206) for II/IV B.Tech (CE)	FEM and its applications have been suggested instead of the propsed	It has been resolved that the modified syllabus is recommended for approval	
MATH-BOS-1207	To recommend the introduction of Ph.D programme in		It has been	

K L University

DEPARTMENT OF MATHEMATICS & COMPUTING

PROPOSED SYLLUBS FOR II/IV B.TECH (COMMON TO ALL BRANCHS: (BT, CE, CSE, ECE, ECM, EEE, ME) WITH EFFECT FROM THE A.Y.: 2012-2013

Course Title : PROBABILITY AND STATISTICS
Credits : 4 **L-T-P : 3-1-0**

CODE : 12-BS201

BRANCH : Common to all Branches

LECTURE HOURS: 45

Prerequisite: Nil

Course Context and Overview:

This course belongs to basic sciences (BS) group. This course is offered in the third semester of a B. Tech programme to all branches of engineering.

It is pre-requisite to a range of courses in all branches of engineering, in computer science like data mining, network model designing etc in electronics like signals and system etc. It would require knowledge of set theory, differential and integral calculus and matrix theory and probability concepts.

The course focuses primarily on the study of Statistics. The field of Statistics pertains to the presentation, analysis and interpretation of data. Engineers will be faced with the need to analyze data on a daily basis in the real world and thus a good grounding in the basics of statistics is invaluable. Statistics is inherently inductive since inference is made about a whole population on the basis of information/data obtained from a sample from the population. Basic concepts in statistics, probability and basic statistical techniques are introduced and reinforced through the study of applications in statistics. The topics covered include descriptive statistics, correlation, regression, probability measures, normal and sampling distributions, estimation and tests of hypothesis (large and small samples) and analysis of variance.

Statistics provides the reasoning and methods for producing and understanding data. Statisticians are specialists, but statistics demands they be generalists, too. One advantage of working in statistics is that you can combine your interest with almost any other field in science, technology, or business.

One of the main competencies that an engineer has to acquire knowledge in estimating the parameters, testing of hypothesis.

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Syllabus:

Descriptive Statistics: Frequency distribution, graphical presentation of data by frequency curve and cumulative frequency curves. Mean, medium, mode and t properties (without derivation) and calculation of median by graphs, range, mear standard deviation and coefficient of variation.

Correlation and Regression: Bi-variate data, simple correlation and regression coeff their relations. Limits of correlation coefficients, effect of change of origin and correlation coefficient, linear regression and equations of line of regression.

Probability and sampling distributions: Random experiments, events exhaustive, exclusive and equally likely. Axiomatic definition of probability and probability definitions and simple properties of binomial, Poisson, normal, exponential and g distributions and their inter relations. Concept of population and sample: Random methods of taking simple random sample. Sampling distributions of mean when σ kn unknown.

Statistical tests of hypothesis: Sampling distribution of mean and standard error, Large tests (Test for an assumed mean and equality of two population means with known SD) sample tests (t-test for an assumed mean and equality of means of two populations when observations are independent). Chi-square test –independence of attributes, goodness of fi

Analysis of Variance: General principles, completely randomized design, randomized blo designs.

BOOKS:

Text Book:

1) Miller and Freund's, "Probability and Statistics for Engineers", Richard A Johnson, PHI New Delhi, 11th Edition.

Reference Books:

1) Probability and Statistics for Engineers, Jay L. Devore, CENAGE learning.

2) Fundamentals of Mathematical Statistic, S C Gupta and V K Kapoor, S Chand & Sons, Ne Delhi, 11th Edition.

3) Higher Engineering Mathematics by B.S.Grewal, 41st Edition, Khanna Publishers, New Delhi.

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DEPARTMENT OF MATHEMATICS & COMPUTING
PROPOSED SYLLUBS FOR II/IV B.TECH (COMPUTER SICENCE, ELECTRONICS AND COMPUTER ENGINEERING) WITH EFFECT FROM THE ACADEMIC YEAR 2012-13

Course : **MATHEMATICAL METHODS FOR COMPUTING**

L-T-P: 3-1-0

Credits : **4**

CODE : **12-BS203**

BRANCH : **COMMON FOR CSE& ECM**

LECTURE HOURS : 45

Prerequisite: Engineering Mathematics (11BS101)

Course Context and Overview

This course is offered as a basic science course for the B. Tech program for the 3rd semester of CSE and ECM. Mathematical methods for computing is the discipline concerned with the application of theory, knowledge, and practice for effectively and efficiently building the techniques of Fourier series and transforms also numerical methods and linear programming.

This course is intended to highlight the importance of the numerical methods such as bisection method, Newton-Raphson method, Gauss elimination method, Gauss-Seidel method, Newton-forward, back ward, Gauss, Stirling, Lagrange's and Newton divided difference interpolation formulae. Solving first order differential equations by using Picard's, Taylor's, Euler, modified Euler and Runge- Kutta method of fourth order. Also this course includes Fourier series, Euler's formula, Fourier series for even and odd functions, half range series, Parseval's formula. Further, it involves Fourier transforms, Fourier sine and cosine transforms, finite Fourier sine and cosine transforms, and its inverse transforms, Parseval's identity. Finally, this course deals with Linear programming, formation and solution of LPP by simplex, big-M method, transportation and assignment problems.

This course provides a broad background to numerical methods common to various branches of engineering viz CSE and ECM. It starts with the core concepts of error estimate and accuracy of numerical solutions and thereafter deals with methods of solution of linear and non-linear equations. Both direct and iterative solution methods are discussed.

A Fourier series decomposes periodic functions or periodic signals into the sum of a (possibly infinite) set of simple oscillating functions, namely sin and cosine (or complex exponentials).

The Fourier transform is a mathematical operation that decomposes a function into its constituent frequencies, known as its frequency spectrum. For instance, the transform of a musical chord made up tones (without overtones) is a mathematical representation of the amplitudes and phases of the individual tones that make it up. The composite waveform depends on time, and therefore is called the time domain representation. The term "Fourier transform" refers to both the transform operation and to the complex-valued function it produces. In the case of a periodic function, like the musical chord, the Fourier transform can be simplified to the calculation of a discrete set of complex amplitudes, called Fourier series.

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Linear programming (LP, or linear optimization) is a mathematical method for determining a way to achieve the best outcome (such as maximum profit or lowest cost) in a given mathematical model for some list of requirements represented as linear relationships. Linear programming is a specific case of mathematical programming (mathematical optimization). More formally, linear programming is a technique for the optimization of a linear objective function, subject to linear equality and linear inequality constraints. Its feasible region is a convex polyhedron, which is a set defined as the intersection of finitely many half spaces, each of which is defined by a linear inequality. Its objective function is a real-valued affine function defined on this polyhedron. A linear programming algorithm finds a point in the polyhedron where this function has the smallest (or largest) value if such point exists.

The course will be conducted as a set of lectures, presentations, tutorials and assignments.

SYLLABUS

FOURIER SERIES: Introduction, Euler's formulae, change of interval, Fourier series for even and odd functions, half range series, Parseval's formula.

FOURIER TRANSFORMS: Introduction, Fourier integral theorem, Fourier integrals, Fourier sine and cosine integrals, Fourier transforms, Fourier sin and cosine transforms, convolution theorem, Parseval's identities, Relation between Fourier and Laplace transforms.

NUMERICAL METHODS: Solution of algebraic and transcendental equations- bisection method, iterative method, Newton -Raphson method. Solutions of linear simultaneous equations- Jacobi and Gauss-Seidel methods. Relations between the difference operators, Newton's forward and back ward interpolation formulae, Gauss, Sterling and Bessel central difference formulae, Lagrange and Newton divided difference formulae for unequal intervals. Numerical differentiation by Newton forward and backward formulae. Numerical integration by trapezoidal, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule. Numerical solutions of ODE-Picard, Taylor, Euler, modified Euler and R-K methods.

LINEAR PROGRAMMING : Introduction, formulation of LPP and solving by simplex and big-M methods. Assignment and transportation problems.

Text Books :

1) Advanced Engineering Mathematics by Ervin Kreyszic, 8^{th} Edition, John Wiley student edition, New Delhi.
2) Higher Engineering Mathematics by B.S.Grewal, 41^{st}Edition. Khanna Publishers, New Delhi.

Reference Books

1) Numerical methods for scientific and engineering computation by M.K. Jain, S.R.K. Iyengar and R.K. Jain, New age international publishers (Fifth edition), New Delhi.
2) Advanced Engineering Mathematics, Michael D. Greenberg, Pearson Education.

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DEPARTMENT OF MATHEMATICS & COMPUTING
PROPOSED SYLLUBS FOR II/IV B.TECH (ELECTRICAL AND ELECTRONICS ENGINEERING) WITH EFFECT FROM THE ACADEMIC YEAR 2012-13

Course : NUMERICAL METHODS AND TRANSFORMS **L-T-P : 3-1-0**
Credits : 4

CODE : 12-BS204

BRANCH : EEE

LECTURE HOURS: 45

Prerequisite: Nil

Course Context and Overview

This course is offered as a basic science course for the B.Tech Program in the 3rd semester of Electrical and Electronics Engineering. This course provides a broad background to numerical methods and transforms for Electrical and Electronics Engineering. It include some methods relating to approximate roots of algebraic and transcendental equations using bisection, iteration and Newton-Raphson methods. Solutions of system of linear equations using Jacobi and Gauss-Seidel. Solutions of system of non linear equations by Newton Raphson method. Numerical solutions of first order differential equations: Euler, modified Euler and Rangue-Kutta Methods and simultaneous first order ODE by R-K Method.

Also this course includes Fourier series, Euler's formula, Fourier series for even and odd functions, half range series, Parseval's formula and harmonic analysis. Further, it involves Fourier transforms, Fourier sine and cosine transforms, finite Fourier sine and cosine transforms and its inverse transforms. Parseval's identity and discrete Fourier, fast Fourier transforms. Finally, this course deals with Z-transforms, inverse Z-transforms and applications of Z-transforms.

Numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations. Although there are many kinds of numerical methods, they have one common characteristic: they invariably involve large numbers of tedious arithmetic calculations. It is little wonder that with the development of fast, efficient digital computers, the role of numerical methods in engineering problem solving has increased dramatically in recent years.

Numerical methods naturally find applications in all fields of engineering and the physical sciences. Recently the life sciences and even the arts have adopted elements of scientific computations. Ordinary differential equations appear in the movement of heavenly bodies (planets, stars and galaxies), numerical linear algebra is important for data analysis; stochastic differential equations and Markov chains are essential in simulating living cells for medicine and biology. Before the advent of modern computers numerical methods often depended on hand interpolation in large printed tables. Since the mid 20th century, computers calculate the required functions instead. The interpolation algorithms nevertheless may be used as part of the software for solving differential equations.

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This course provides a broad background to numerical methods for Electrical and Electronics Engineering. It starts with the core concepts of error estimate and accuracy of numerical solutions and thereafter deals with methods of solution of linear and non-linear equations. Both direct and iterative solution methods are discussed.

A Fourier series decomposes periodic functions or periodic signals into the sum of a (possibly infinite) set of simple oscillating functions, namely sin and cosine (or complex exponentials). The Fourier transform is a mathematical operation that decomposes a function into its constituent frequencies, known as its frequency spectrum. For instance, the transform of a musical chord made up tones (without overtones) is a mathematical representation of the amplitudes and phases of the individual tones that make it up. The composite waveform depends on time, and therefore is called the time domain representation. The term "Fourier transform" refers to both the transform operation and to the complex-valued function it produces. In the case of a periodic function, like the musical chord, the Fourier transform can be simplified to the calculation of a discrete set of complex amplitudes, called Fourier series. The development of communication branch is based on discrete analysis. Z-transform plays the vital role in discrete analysis. A discrete system is expressible as a difference equation and its solutions are found using Z-transforms. The course will be conducted as a set of lectures, presentations, tutorials, assignments and home assignments.

SYLLABUS

NUMERICAL METHODS: Solution of algebraic and transcendental equations-bisection method, iterative method, Newton -Raphson method. Solutions of linear simultaneous equations-Gauss elimination and LU factorization methods, Jacobi and Gauss-Seidel method, non linear equations by Newton-Raphson method. Numerical solutions of first order ODEs- Euler, modified Euler, Runge-Kutta method of fourth order and simultaneous first order ODE by R-K method.

FOURIER SERIES: Introduction, Euler's formulae, change of interval, Fourier series for even and odd functions, half range series, Parseval's formula, Fourier series for typical wave forms and harmonic analysis.

FOURIER TRANSFORMS: Introduction, Fourier integral theorem, Fourier integrals, Fourier sine and cosine integrals, complex form of Fourier integrals, Fourier transforms, Fourier sine and cosine transforms, Convolution theorem, Parseval identities. Discrete Fourier transform, fast Fourier transforms.

Z-TRANSFORMS: Introduction, properties of Z-transforms, inverse Z-transforms, convolution theorem and solving difference equations by Z-transforms.

Text Books :

1) Advanced Engineering mathematics, international student edition by Peter V.O'Neil, CENGAGE Learning India P.Ltd, second Indian reprint 2008.
2) Higher Engineering Mathematics by B.S.Grewal, 41st Edition, Khanna Publishers, New Delhi.

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Reference Books

1) Control systems Engineering (Fifth edition) by I.J. Nagrath and M. Gopal, New age international publishers, New Delhi, 2008.
2) Advanced Engineering Mathematics by Ervin Kreyszig, 8th Edition, John Wiley student edition, New Delhi.
3) Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K. Iyengar and R.K.Jain, Newage International Publishers (Fifth edition), New Delhi, 2007.

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DEPARTMENT OF MATHEMATICS & COMPUTING

PROPOSED SYLLUBS FOR II/IV B.TECH (ELECTROINCS AND COMMUNICATION ENGINEERING) WITH EFFECT FROM THE ACADEMIC YEAR 2012-13

Course : **PARTIAL DIFFERENTIAL EQUATIONS AND NUMERICAL METHODS**

Credits : **4** **L-T-P: 3-1-0**

CODE : **12-BS205**

BRANCH : **ECE**

LECTURE HOURS: 45

Prerequisite: Engineering Mathematics (11BS101)

Course Context and Overview

This course is offered as a basic science course for the B. Tech Program in the 3rd semester of Electronics and communication Engineering. This course provides a broad background to partial differential equations for Electronics and communication Engineering. Partial differential equations (PDEs) are used to formulate, and thus aid the solution of, problems involving functions of several variables. PDEs are : for example used to describe the propagation of sound or heat, electrostatics, electrodynamics, fluid flow, and elasticity. These seemingly distinct physical phenomena can be formalized identically (in terms of PDEs), which shows that they are governed by the same underlying dynamic. Partial differential equations often model multidimensional systems. This course also provides a broad background to numerical methods for electronics and communication engineering. It include some methods relating to approximate root of algebraic and transcendental equations using bisection and Newton-Raphson method, approximate solutions of system of linear equations using Jacobi and Gauss-Seidel, interpolation techniques with equal and unequally spaced intervals: Newton forward and backward, Gauss forward and backward, Stirling and Bessel interpolation formulas. Numerical differentiation and integration: Newton forward and backward, Simpson 1/3rd and 3/8th rules, Numerical solutions of first order differential equations: Picard and Taylor series, Euler, modified Euler and Rangue-Kutta methods. Numerical solutions of Laplace and Poison equations using finite difference method. Model and formation of Partial differential equations, solutions of first order linear and nonlinear PDEs, solutions of second order homogeneous and non-homogeneous PDEs with constant coefficients.

Numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations. Although there are many kinds of numerical methods, they have one common characteristic: they invariably involve large numbers of tedious arithmetic calculations. It is little wonder that with the development of fast, efficient digital computers, the role of numerical methods in engineering problem solving has increased dramatically in recent years.

Numerical methods naturally find applications in all fields of engineering and the physical sciences. Recently the life sciences and even the arts have adopted elements of

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scientific computations. Ordinary differential equations appear in the movement of heavenly bodies (planets, stars and galaxies), numerical linear algebra is important for data analysis; stochastic differential equations and Markov chains are essential in simulating living cells for medicine and biology. Before the advent of modern computers numerical methods often depended on hand interpolation in large printed tables. Since the mid 20th century, computers calculate the required functions instead. The interpolation algorithms nevertheless may be used as part of the software for solving differential equations.

The course will be conducted as a set of lectures, presentations, tutorials, assignments and home assignments.

SYLLABUS:

PARTIAL DIFFERENTIAL EQUATIONS : Introduction, Formation of PDEs, solutions of first order linear and non linear PDEs by direct integration method, Lagrange's method and Charpit's method. Solutions of second order homogeneous and non homogeneous PDEs with constant coefficients.

NUMERICAL METHODS: Solution of algebraic and transcendental equations - bisection method, iterative method and Newton-Raphson method. Solutions of linear simultaneous equations-Jacobi and Gauss-Seidel methods. Relation between the difference operators, Newton's forward and back ward, Gauss, Sterling and Bessel central difference formulae, Lagrange and Newton divided difference interpolation formulae. Numerical differentiation by Newton forward and backward formulae. Numerical integration by trapezoidal, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule. Numerical solutions of first order ODEs - Picard, Taylor, Euler, modified Euler and Runge-Kutta method of fourth order. Numerical solutions of BVPs in ordinary and partial differential equations using finite difference method.

Text Books :

1) Advanced Engineering mathematics, **Alan Jeffrey ,** Academic press, Indian reprint, 2010.
2) Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar and R.K.Jain, New age international publishers(Fifth edition), New Delhi, 2007.
3) Higher Engineering Mathematics by B.S.Grewal, 41^{st} Edition, Khanna Publishers, New Delhi.

Reference Books

1) Advanced Engineering Mathematics by Ervin Kreyszig, 8^{th} Edition, John Wiley student edition, New Delhi.
2) Advanced Engineering Mathematics, Michael D. Greenberg, 4^{th} edition, Pearson Education.

Dr. V. Uma Maheswara Rao — V. Uma Maheswara Rao

Dr. P.V.S.S. Sanyasi Rao —

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DEPARTMENT OF MATHEMATICS & COMPUTING

PROPOSED SYLLUBS FOR II/IV B.TECH (~~ELECTROINCS AND COMMUNICATION~~ ENGINEERING) WITH EFFECT FROM THE ACADEMIC YEAR 2012-13

Course : PARTIAL DIFFERENTIAL EQUATIONS AND NUMERICAL METHODS

Credits : 4 **L-T-P: 3-0-2**

CODE : 12-BS206

BRANCH : CE

LECTURE HOURS: 45

Prerequisite: Nil

Course Context and Overview

This course is offered as a basic science course for the B. Tech program in the 4th semester of Civil Engineering. This course provides a broad background to partial differential equations for Civil Engineering. Partial differential equations (PDEs) are used to formulate, and thus aid the solution of, problems involving functions of several variables. PDEs are : for example used to describe the propagation of sound or heat, electrostatics, electrodynamics, fluid flow, and elasticity. These seemingly distinct physical phenomena can be formalized identically (in terms of PDEs), which shows that they are governed by the same underlying dynamic. Partial differential equations often model multidimensional systems. This course also provides a broad background to numerical methods for Civil Engineering. It include some methods relating to approximate root of algebraic and transcendental equations using bisection and Newton-Raphson method, approximate solutions of system of linear equations using Jacobi and Gauss-Seidel. Interpolation techniques with equal and unequally spaced intervals: Newton forward and backward, Gauss forward and backward, Stirling and Bessel interpolation formulae. Numerical differentiation and integration: Newton forward and backward, Simpson 1/3rd and 3/8th rules. Numerical solutions of first order differential equations: Picard and Taylor series, Euler, modified Euler and Rangue-Kutta methods. Numerical solutions of Laplace and Poison equations using finite difference method.

Numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations. Although there are many kinds of numerical methods, they have one common characteristic: they invariably involve large numbers of tedious arithmetic calculations. It is little wonder that with the development of fast, efficient digital computers, the role of numerical methods in engineering problem solving has increased dramatically in recent years.

Numerical methods naturally find applications in all fields of engineering and the physical sciences. Recently the life sciences and even the arts have adopted elements of scientific computations. Ordinary differential equations appear in the movement of heavenly bodies (planets, stars and galaxies), numerical linear algebra is important for data analysis;

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stochastic differential equations and Markov chains are essential in simulating living cells for medicine and biology. Before the advent of modern computers numerical methods often depended on hand interpolation in large printed tables. Since the mid 20th century, computers calculate the required functions instead. The interpolation algorithms nevertheless may be used as part of the software for solving differential equations.

The course will be conducted as a set of lectures, presentations, tutorials, assignments and home assignments.

SYLLABUS:

PARTIAL DIFFERENTIAL EQUATIONS : Introduction, Formation of PDEs, solutions of first order linear and non linear PDEs by direct integration method, Lagrange's method and Charpit's method. Solutions of second order homogeneous and non homogeneous PDEs with constant coefficients.

NUMERICAL METHODS: Solution of algebraic and transcendental equations-bisection method, iterative method and Newton -Raphson method. Solutions of linear simultaneous equations- Jacobi and Gauss-Seidel methods. Relation between the difference operators, Newton's forward and back ward interpolation formulae, Gauss, Sterling and Bessel central difference formulae, Lagrange and Newton divided difference formulas for unequal intervals, Numerical differentiation by Newton's forward and backward formulae, Numerical integration by trapezoidal, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule. Numerical solutions of ODE-Picard, Taylor, Euler, modified Euler and Runge-Kutta method of fourth order. Finite element methods and their applications.

Text Books :

1) Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar and R.K.Jain, New age international publishers (Fifth edition), New Delhi, 2007.

2) Higher Engineering Mathematics by B.S. Grewal, 41^{st} Edition, Khanna Publishers, New Delhi.

Reference Books

1) Advanced Engineering Mathematics by Ervin Kreyszig, 8^{th} Edition, John Wiley student edition, New Delhi.
2) Applied numerical methods with MATLAB for engineers and Scientists by Steven C Chapra, Tata McGraw Hill, New Delhi, Third Indian reprint 2008.

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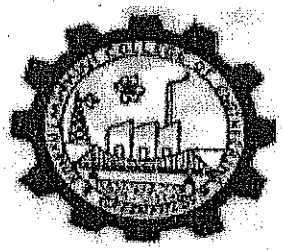
GREENFIELDS, VADDESWARAM, GUNTUR DT.,
PHONE Nos: 08645246948, http://www.kluniversity.in

Department of Mathematics & Computing



M.Sc., (Applied Mathematics)

K L University
Greenfields, Vaddeswara,
Guntur District, Andhra Pradesh

2012-2014

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Annexure - I

M.Sc., (Applied Mathematics)

Program Structure

M Sc., Applied Mathematics:

Semester-I

Code	Course	L	Tutorial/Seminar	P	Credits
12-AM501	Real Analysis	5	1	0	4
12-AM502	Mathematical methods	5	1	0	4
12-AM503	Discrete Mathematical structures	5	1	0	4
12-AM504	Numerical methods and programming language -C	5	1	0	4
12-AM505	Linear Algebra	5	1	0	4
12-AM506	C-Programming Laboratory	0	0	3	2
	TOTAL	**25**	**5**	**3**	**22**

(Dr. V. Uma Maheswara Rao) – V. Uma Maheswara Rao

(Dr. Y. V. S. S. Sanyasi Raju) – Sreepadada

Dr. V. S. Bhagavan – V.S.Bhagavan

Dr. B. V. Appa Rao – B.V.A.

Dr. A S N Murthy – A.S.N.M.

V. Vasanth Kumar

Dr. V. VASANTH KUMAR
Professor
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VADDESWARAM-522 502.

Semester-II

Code	Course	L	Tutorial/Seminar	P	Credits
12-AM507	Complex Analysis	5	1	0	4
12-AM508	Techniques of Applied Mathematics	5	1	0	4
12-AM509	Advanced numerical methods and C++	5	1	0	4
12-AM510	Algebra	5	1	0	4
12-AM511	Statistical methods	5	1	0	4
12-AM512	C++ programming lab	0	0	3	2
	TOTAL	**25**	**5**	**3**	**22**

Dr. V. Uma Maheswara Rao. – V. Uma Maheswara Rao

Dr. Y. V. S. S. Sanyasi Raju – [signature]

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Semester-III

Code	Course	L	Tutorial/Seminar	P	Credits
12-AM513	Mathematical Modeling	5	1	0	4
12-AM514	Number theory	5	1	0	4
12-AM515	Optimization techniques	5	1	0	4
12-AM516	Elective – I	5	1	0	4
12-AM517	Elective-II	5	1	0	4
12-AM518	MAT LAB	0	0	3	2
	TOTAL	**25**	**5**	**3**	**22**

Dr. V. Uma Maheswara Rao. – V. Uma Maheswara Rao

Dr. Y. V. S. S. Sanyasi Raju – Jagadish

Dr. V. S. Bhagavan – Bhagavan

Dr. B. V. Appa Rao – BVA

Dr. A S N Murthy – ASN

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Semester-IV

Code	Course	L	Tutorial/ Seminar	P	Credits
12-AM519	Theory of computer science	5	1	0	4
12-AM520	Advanced optimization techniques	5	1	0	4
12-AM521	Cryptography	5	1	0	4
12-AM522	Elective – I	5	1	0	4
12-AM523	Elective-II	5	1	0	4
12-AM524	Project Work	0	0	12	6
	TOTAL	**25**	**5**	**12**	**26**

List of Electives

1. JAVA / Soft Computing
2. Financial Mathematics / Stochastic Process
3. Advanced Techniques of Applied Mathematics
4. Boundary Value Problems / Advanced Boundary Value problems
5. Fluid Dynamics / Computational Fluid Dynamics
6. Artificial Intelligence
7. Relativity and Cosmology
8. Dynamical Systems
9. Control Systems

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