JABALPUR ENGINEERING COLLEGE, JABALPUR (M.P.)

Scheme of Examination w.e.f. July, 2017 batch

FIRST SEMESTER (M.Sc. Applied Mathematics)

S.NO.	SUBJECT CODE	SUBJECT	Periods Per Week				Maximum Marks (Theory Slots)			Maximum marks (Practical Slots)		Total Marks	Remarks
			L	T	P	TOTAL Credits	End Sem. Exam	Mid Sem Exam	Assignment/ Quiz	End Semester Practical/ Viva	Practical Record/ Assignment/Quiz/ Presentation		
1	AM1001	Abstract Algebra	4	1	...	5	70	20	10	...	.....	100	
2	AM1002	Mathematical Analysis	4	1	...	5	70	20	10	...	...	100	
3	AM1003	Mathematical Methods	4	1	...	5	70	20	10	...	.....	100	
4	AM1004	ELECTIVE-I	4	1	...	5	70	20	10	...	.....	100	
5	AM1005	LAB-I (Computer Programming in C)	....	...	8	8	...	...	...	90	60	150	
6	AM1006	Self Study & Group Discussion	...	...	4	4	...	...	...	...	100	100	
		TOTAL	**16**	**4**	**12**	**32**	**280**	**80**	**40**	**90**	**160**	**650**	

L-Lecture T-Tutorial P-Practical

Elective I: ~~AM9004A~~-Linear Algebra & Applications
Elective-I: ~~AM9004B~~-Differential Equations & Applications
Elective-I: ~~AM9004C~~- Introduction to Coding Theory

JABALPUR ENGINEERING COLLEGE, JABALPUR

M.Sc. I Semester (Applied Mathematics)

ABSTRACT ALGEBRA

Subject Code : AM 1001

UNIT-I

Group, sub group, solvable group direct product, Cauchy theorem Finite abelian group.

UNIT-II

Ideals and quotient rings, more about ideals and quotient rings, Euclidean rings, polynomials over the rational field, polynomial rings over cumulative rings, unique factorization domain.

UNIT-III

Extension fields and algebric extension, roots of polynomials, construction with straight edge and compass, more about roots.

UNIT-IV

Modules, sub modules, cyclic modules, direct sum of modules, fundamental theorem on finitely generated modules over Euclidean rings, solvability by radicals.

UNIT-V

The element of Galois theory, automorphism of a fixed, fixed field of a automorphism, normal extension, fundamental theorem of Galois theory.

Books Recommended:

1. **Herstein. I. N.** **Topics in Algebra**
2. **Vasistha A.R.** **Modern Algebra**

HKpatel 20/7/18

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JABALPUR ENGINEERING COLLEGE, JABALPUR

M.Sc. I Semester(Applied Mathematics)

MATHEMATICAL ANALYSIS

Subject Code : AM 1002

UNIT-I

Metric spaces, limits in metric spaces, function continuous on a metric spaces, open sets, closed sets, complete metric space Riemann integral existence of Riemann integral, properties of Riemann integral.

UNIT-II

Riemann Stieltjes integrals, conditions of integrability, length of open sets and closed sets, inner and outer measures of bounded sets, measurable sets, properties of measurable sets, sets of measure zero, non-measureable sets, measurable functions.

UNIT-III

Lebesgue integral for bounded measurable function, Lebesgue integral for unbounded function, Lebesque theorem on bounded convergence, Lebesgue dominated convergence theorem Fatou's lemma.

UNIT-IV

The Labesgue class L_p, the metric space $L^2[a,b]$, Minkowski's, Schwartz, Bessels and Parsewals inequality, completeness of $L^2\ [a,b]$ the Lebesque integral in the plane.

UNIT-V

Fourier series, definition, formulation of convergence problem. The $[C,1]$ summability of Fourier series. The $L-2$ theory of Fourier series, convergence of Fourier series, Riemann Leabesgue theorem, Dirichlet condition, half range series.

Books Recommended:

1. R.R. Goldberg: Methods of Real Analysis John Wiley & Sons.
2. S.C. Malik; Mathematical Analysis, New Age International Limited.

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JABALPUR ENGINEERING COLLEGE, JABALPUR

M.Sc. I Semester(Applied Mathematics)

MATHEMATICAL METHODS

Subject Code : AM 1003

UNIT-I

Laplace transform: Integral transform, Laplace transform, definition, existence theorem, Laplace transform of standard functions, first shifting theorem, Laplace transform of derivatives and integrals, periodic functions, inverse transform, heavisides expansion formula, convolution theorem, solution of ordinary differential equations, Laplace transform of unit step and impulse functions, second shifting theorem.

UNIT-II

Tensors: Curvilinear co-ordinates, tensors, summation and convolution, contravariant covariant and mixed tensors, Kronecker delta, fundamental operations with tensors, symmetric and skew-symmetric tensors, matrix representation of a tensor, metric tensors, associated tensors, Christoffel's symbols, geodesics covariant, differentiation of a tensor, gradient, divergence and curl in tenser form, intrinsic derivative, relative tensors.

UNIT-III

Calculus of variation: Stationery values of a functional, Euler's equations in two independent variables, isoperimetric problems, generalised boundary conditions and transversability condition for variable and point, Brachistochrone's problem.

UNIT-IV

Integral equations: Introduction, preliminary concepts formulation of integral equations, classification of integral equations, relation between integral and differential equations, resolvent kernel, solution of integral equation by the method of resolvent kernel, iteration methods.

UNIT-V

Integral equations: Construction of green's function for homogenous and non-homogeneous end conditions, reduction of initial and boundary value problems to integral equations, Fredholm equations with separable kernels, application of Fredholm theory to deflection of string, singular kernel, Abel's integral

Books Recommended:

1. Murray and Spiegel, R: Vector Analysis (Schaum Series)
2. Hildel F.R.: Method of Applied Mathematics
3. Shanti Swarup: Linear Integral Equations
4. Lown W.V.: Integral Equations.

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M.Sc. I Semester(Applied Mathematics)

DIFFERENTIAL EQUATIONS & APPLICATIONS

Subject Code : AM 1004

UNIT-I

Linear dependence of solution of a differential equation, Wronskian, general solution for second order differential equation of the form $y'' + py' + qy = r$ by (i) known integral (ii) removal of first derivative, (iii) changing the independent variable, (iv) Method of operational factors, exact differential equation, condition of exactness, integrating factors.

UNIT-II

Series solution of differential equation by Frobenius method, solution of Bessel's differential equation, Bessel function, recurrence relations, generating function for $J_n(x)$, integral representations, orthogonality property, Fourier-Bessel expansion. Temperature in long cylinder, heat transfer at the surface of the cylinder and vibration of a circular membrane.

UNIT-III

Series solution of Legendre's differential equation, definition of $P_n(x)$ and $Q_n(x)$, generating function, Rodrigue's formula, recurrence relations, orthogonality property Fourier-Legendre expansions, solution of Hermite differential equation, Hermite polynomials, generating function, Rodrigue's formula, recurrence relations.

UNIT-IV

Monge's method, vibrating string initially displaced, discussion of solution prescribed initial velocity, non-homogenous differential equations, elastic bar temperature in a bar, other boundary conditions, Dirichlet's problem.

UNIT-V

Two dimensional heat flow, two dimensional Laplace's equation in polar co-ordinates transmission line, two dimensional wave equation, Laplace's equation in three dimension in Cartesian, cylindrical and spherical forms.

Books Recommended:

1. Sharma J.N. and Gupta R.K.: Differential Equation, Krishna Prakashan.
2. Chaturvedi, J.C., Ray, M and Sharma, H.S.: A text book of differential equation, students friends, Agra.
3. Grewal, B.S. Higher Engineering Mathematics, Khanna Publisher, Delhi.
4. Saran, N and Sharma, S,D.: Special Functions, Pragati Prakashan, Meerut.
5. Churchil, R.V.: Fourier Series and Boundary Value Problems, Mcgraw Hill Book Co. Inc.

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