

**GOVT. D.B. GIRLS' P.G. (AUTONOMOUS) COLLEGE
RAIPUR CHHATTISGARH**

FACULTY OF MATHEMATICS

SYLLABUS

OF

B.Sc. MATHEMATICS PART-II

2020-21

Signature of Chairman

Signature of Member (Subject)

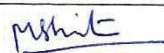
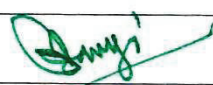
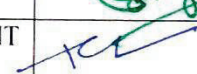
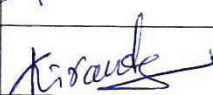
Govt. D.B. Girls' P.G. College,
Raipur (C.G.)


Part A

Theory

No.	Title	Marks		Total
		Max.	Min.	
Paper-I	Advanced Calculus	50	17	50
Paper-II	Differential Equations	50	17	50
Paper-III	Mechanics	50	17	50

APPROVED BY THE BOARD OF STUDIES ON

NAME	IN THE CAPACITY OF	SIGNATURE
Dr. MADHU SHRIVASTAVA	CHAIRMAN	
Dr. B.S. THAKUR	SUBJECT EXPERT (University Nominee)	
Dr. AMITABH BANERJEE	SUBJECT EXPERT (Principal Nominee)	
Mrs. RASHMI SENGUPTA	MEMBER OF THE DEPARTMENT	
Mrs. KIRAN DEWANGAN	MEMBER OF THE DEPARTMENT	
Ku. SANDHYA SAHU	EX-STUDENT	


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 Signature of Member Subject

DEPARTMENT OF MATHEMATICS
B.Sc. PART - II
MATHEMATICS
SESSION : 2020-21
PAPER - I
ADVANCED CALCULUS

Maximum Marks: 50
Minimum Marks: 17

Number of Units : V

UNIT - I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison test, Cauchy's integral test, Ratio test, Raabe's test, Logarithmic test, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem, absolute and conditional convergence.

UNIT - II

Continuity, sequential continuity, properties of continuous functions, uniform continuity. Chain rule of differentiability, Mean value theorems and their geometrical interpretations, Darboux's intermediate value theorem for derivatives. Taylor's theorem with various forms of remainders.

UNIT - III

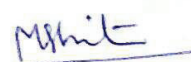
Limit and continuity of functions of two variables, Partial differentiation, Change of variables, Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

UNIT - IV

Envelopes, Evolutes, Maxima, Minima and saddle points of functions of two variables, Lagrange's multiplier method.

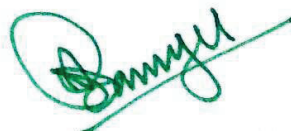
UNIT - V

Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, change of order of integration in double integrals.


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DEPARTMENT OF MATHEMATICS

B.SC. PART – II

MATHEMATICS

SESSION : 2020-21

PAPER - II

DIFFERENTIAL EQUATIONS

Maximum Marks: 50

Minimum Marks: 17

Number of Units : V

UNIT - I

Series solutions of differential equations - Power series method. Bessel and Legendre functions and their properties - convergence, recurrence and generating relations. Orthogonality of functions. Sturm-Liouville problem, Orthogonality of Eigen-functions, Reality of Eigen-values, Orthogonality of Bessel functions and Legendre polynomials.

UNIT - II

Laplace Transformation - Linearity of the Laplace transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Differentiation and integration of transforms. Convolution theorem. solution of integral equations and systems of differential equations using the Laplace transformation.

UNIT - III

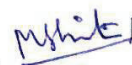
Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method of solution.

UNIT - IV

Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's methods.

UNIT - V

Calculus of Variations - Variational problems with fixed boundaries - Euler's equation for functionals containing first order derivative and one independent variable. External functionals dependent on higher order derivatives. Functionals dependent on more than one independent variable. Variational problems in parametric form. Invariance of Euler's equation under coordinates transformation. Variational problems with moving boundaries - Functionals dependent on one and two functions. One sided variations. Sufficient conditions for an Extremum - Jacobi and Legendre conditions. Second Variation. Variational principle of least action.


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Principal
Govt. D.B. Girls' P.G. College,
Rajpura (C.G.)





DEPARTMENT OF MATHEMATICS
B.Sc. PART – II
MATHEMATICS
SESSION : 2020-21
PAPER - III
MECHANICS

Maximum Marks: 50

Minimum Marks: 17

Number of Units : V

STATICS

UNIT - I

Analytical conditions of equilibrium. Stable and unstable equilibrium. Virtual work. Catenary.

UNIT - II

Forces in three dimensions. Poinot's central axis. Null lines and planes.

DYNAMICS

UNIT - III

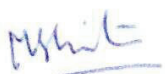
Simple harmonic motion. Elastic strings. Velocities and accelerations along radial and transverse directions. Projectile. Central orbits.

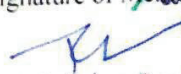
UNIT - IV

Kepler's laws of motion. Velocities and acceleration in tangential and normal directions. Motion on smooth and rough plane curves.

UNIT - V

Motion in a resisting medium. Motion of particles of varying mass. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.


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College
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