महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर
MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER
NAAC Accredited 'B++' Grade State University

Syllabus of B.Sc. Mathematics Semester I & Semester II

Session 2023-2024

Scheme of examination

1-The teaching and examination of Under Graduate Part-I will be on semester basis (Semester-I & Semester-II).

2-The student/faculty are advised to consider the content of the syllabus only for teaching and examination in all Under Graduate Part-I courses.

3-The scheme of the examination for each **External Course** examination in all Under Graduate Part-I semester scheme will be as follow:-

"**Scheme of examination for end of semester examination applicable to all undergraduate courses (Pass course as well as Honours course).**

The question paper of semester Exam for the discipline specific core courses (DSC), Discipline specific elective (DSE), Ability Enhancement Course (AEC), Value Added Course (VAC) and Skill Enhancement Course (SEC) will be of 70 marks and it will be divided in two parts i.e. Part A and Part-B. Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

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B.Sc. Mathematics
Syllabus

Certificate Course (2023-2024) Total Credit-12

Semester I

Major (Discipline Specific Core Course-DSCC)-4 + (Practical)- 2 = 06 Credits

Scheme of Credit & Marks	Paper & Practical
DSCC -04 Credit 100 (70 External+30 Internal) Marks	Mathematical Calculus
Practical - 02 Credit 50 (35 External+15 Internal) Marks	GeoGebra

Semester II

Major (Discipline Specific Core Course-DSCC)-4 + (Practical)- 2 = 06 Credits

Scheme of Credit & Marks	Paper & Practical
DSCC -04 Credit 100 (70 External+30 Internal) Marks	Mathematical Theory
Practical - 02 Credit 50 (35 External+15 Internal) Marks	Advanced GeoGebra

B.Sc. Mathematics Syllabus

Certificate Course (2023-2024)

Semester I **MATHEMATICS** **Credits – 4**

Theory and Tutorial: 4 Classes/Week/Hour (Total 60 Hours per Semester) of Paper of 4 Credits.
One Paper of 100 Marks (External-70 Marks + Internal – 30 Marks)

MATHEMATICAL CALCULUS **Max Marks: 70**

UNIT-I **Differential Calculus:**

Curvature, Asymptotes, Singular points, Tracing of curves. Parametric representation of curves Polar coordinates and tracing of curves in polar coordinates. Partial Differentiation, Euler Theorem.

(हिन्दी अनुवाद)

वक्रता, अनन्तस्पर्शी, विचित्र बिन्दु, वक्र अनुरेखण, वक्रों का प्राचलिक निरूपण, ध्रुवीय निर्देशांक एवं ध्रुवीय निर्देशांको में वक्रों का अनुरेखण, आंशिक अवकलन, आयलर प्रमेय |

UNIT -II **Integral Calculus:**

Fundamental theorem of integral calculus, Mean value theorems of integral calculus, Pappus theorem, Quadrature. Rectification, Volumes and Surfaces generated by Solid of revolution, Multiple integrals, Change of order of double integration, Dirichlet's theorem and Liouville's theorem (Only statement of theorems)

(हिन्दी अनुवाद)

समाकलन गणित का मूलभूत प्रमेय, समाकलन गणित का मध्यमान प्रमेय, पप्पस प्रमेय, क्षेत्रकलन, चापकलन, ठोसों के परिक्रमण द्वारा जनित आयतन एवं पृष्ठ, बहु समाकलन, द्विसमाकल का क्रम परिवर्तन, दिरिचलेट एवं ल्यूवेल का प्रमेय (केवल प्रमेय के प्रकथन)|

UNIT-III **Vector Calculus:**

Differentiation and partial differentiation of a vector function. Derivative of sum, dot product and cross product of two vectors. Gradient, divergence and curl. Gauss, Green's & Stoke's theorems (Only statement of theorems)

(हिन्दी अनुवाद)

एक सदिश फलन का अवकलन एवं आंशिक अवकलन, दो सदिशों के योग, अदिश गुणन तथा सदिश गुणन का अवकलज,प्रवणता, अपसरण एवं कुन्तल, गॉस, ग्रीन और स्टॉक्स प्रमेय (केवल प्रमेय के प्रकथन)|

Internal Assessment **Max Marks: 30**

Three objective test conduct by Department of Mathematics at College level after completing each Unit.

I test from I Unit containing 10 Objective questions of 10 Marks

II test from II Unit containing 10 Objective questions of 10 Marks

III test from III Unit containing 10 Objective questions of 10 Marks

*Records of test is maintained by college and internal marks obtained by students are submitted to University before semester examination start.

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B.Sc. Mathematics Syllabus

Certificate Course (2023-2024)

Semester I **MATHEMATICS (PRACTICAL)** **Total Credits – 2**

One practical paper of 50 Marks (External-35 Marks + Internal – 15 Marks)

Theory and Tutorial: 2 Classes/Week/Hour (Total 30 Hours per Semester) of Paper of 2 Credits.

GeoGebra **Max Marks: 50**

About GeoGebra for Teaching and Learning Mathematics:

Free digital tools for class activities, graphing, geometry, collaborative whiteboard and more

GeoGebra is available on multiple platforms, with apps for desktops, tablets and mobile web etc.

GeoGebra is an interactive **geometry, algebra, and calculus (Based on Mathematics Syllabus)** application, intended for learning and teaching mathematics and science from primary school to university level.

Practical Syllabus:

Conduct 10 practical of following GeoGebra tools, 02 from each tools:

- Graphing Calculator
- Scientific Calculator
- Basic tools
- Edit tools
- Construct tools

The marks distributions in practical exam is as follows:

- Practical exercise 1 Marks- 15
- Practical exercise 2 Marks - 15
- Viva-Voce Marks – 05
- Practical Record (Internal) Marks – 15

Total: Marks – 50

B.Sc. Mathematics Syllabus

Certificate Course (2023-2024)

Semester II MATHEMATICS Credits – 4

Theory and Tutorial: 4 Classes/Week/Hour (Total 60 Hours per Semester) of each Paper of 4 Credits.

One Paper of 100 Marks (External-70 Marks + Internal – 30 Marks)

MATHEMATICAL THEORY **Max Marks: 70**

UNIT - I **Theory of Equations:**

Maximum and minimum values of a polynomials, General properties of equations, Descarte's rule of signs positive and negative rule, Relation between the roots and the coefficients of equations. Symmetric functions, Applications of symmetric function of the roots.

(हिन्दी अनुवाद)

बहुपद के अधिकतम एवं निम्नतम मान, समीकरण के सामान्य गुणधर्म, देकार्त के धनात्मक एवं ऋणात्मक चिन्हों का नियम, समीकरण के मूलों एवं गुणांको के मध्य सम्बन्ध, सममित फलन, मूलों के सममित फलन के अनुप्रयोग|

UNIT -II **Number Theory**

Division algorithm, Lame's theorem, Diophantine equation, prime counting function, binary and decimal representation of integers, linear congruences, complete set of residues. Number theoretic functions, sum and number of divisors, totally multiplicative functions, greatest integer function.

(हिन्दी अनुवाद)

विभाजन एलगोरिथ्म, लेम का प्रमेय, डायोफैंटाइन समीकरण, अभाज्य गणनीय फलन, पूर्णांकों का द्विआधारी एवं दशमलव निरूपण, रेखीय समरूपता, अवशेषों का पूर्ण समुच्चय , सैद्धांतिक संख्या फलन, योग एवं भाजकों की संख्या, पूर्ण गुणात्मक फलन, महत्तम पूर्णांक फलन |

UNIT -III **Theory of Coordinate Geometry:**

Techniques for sketching parabola, ellipse and hyperbola. Reflection properties of parabola, ellipse and hyperbola. Conic sections and standard equations for parabola, ellipse and hyperbola. Spheres, Cylindrical surfaces. Illustrations of graphing standard quadric surfaces cone.

(हिन्दी अनुवाद)

परवलय, दीर्घवृत और अतिपरवलय अनुरेखण हेतु तकनीक, परवलय, दीर्घवृत और अतिपरवलय का परावर्तन गुणधर्म, शंकु परिच्छेद और परवलय, दीर्घवृत और अतिपरवलय का मानक समीकरण, गोला, बेलनीय पृष्ठ, मानक द्विघात सतहों शंकु को रेखांकित करने के उदाहरण |

Internal Assessment **Max Marks: 30**

Three objective test conduct by Department of Mathematics at College level after completing each Unit.

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GeoGebra is an interactive **geometry, algebra, and calculus (Based on Mathematics Syllabus)** application, intended for learning and teaching mathematics and science from primary school to university level.

Practical Syllabus:

Conduct 10 practical of following GeoGebra tools, 02 from each advance tools:

- Measure
- Circle
- Polygon
- Transform
- 3 D Calculator

The marks distributions in practical exam is as follows:

- Practical exercise 1 Marks - 15
- Practical exercise 2 Marks - 15
- Viva-Voce Marks – 05
- Practical Record (Internal) Marks – 15

Total: Marks – 50