Academic Year 2021-2022

GOA UNIVERSITY
गोंय विद्यापीठ

GOA BUSINESS SCHOOL

RANKED BRICS 2019

ALL INDIA RANK 81 NIRF 2020

GOVT. UNIV. RANK 20 INDIA TODAY 2019

ALL INDIA RANK 36 THE WEEK 2019

"PROGRAMME FOR 10+2 STUDENTS WITH MATHEMATICS"

an Interdisciplinary Integrated
Master's Degree programme

Master of Science (M.Sc.)

in

Computer Science, Data Science, Decision Science or Economics

www.unigoa.ac.in

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About **Goa University**

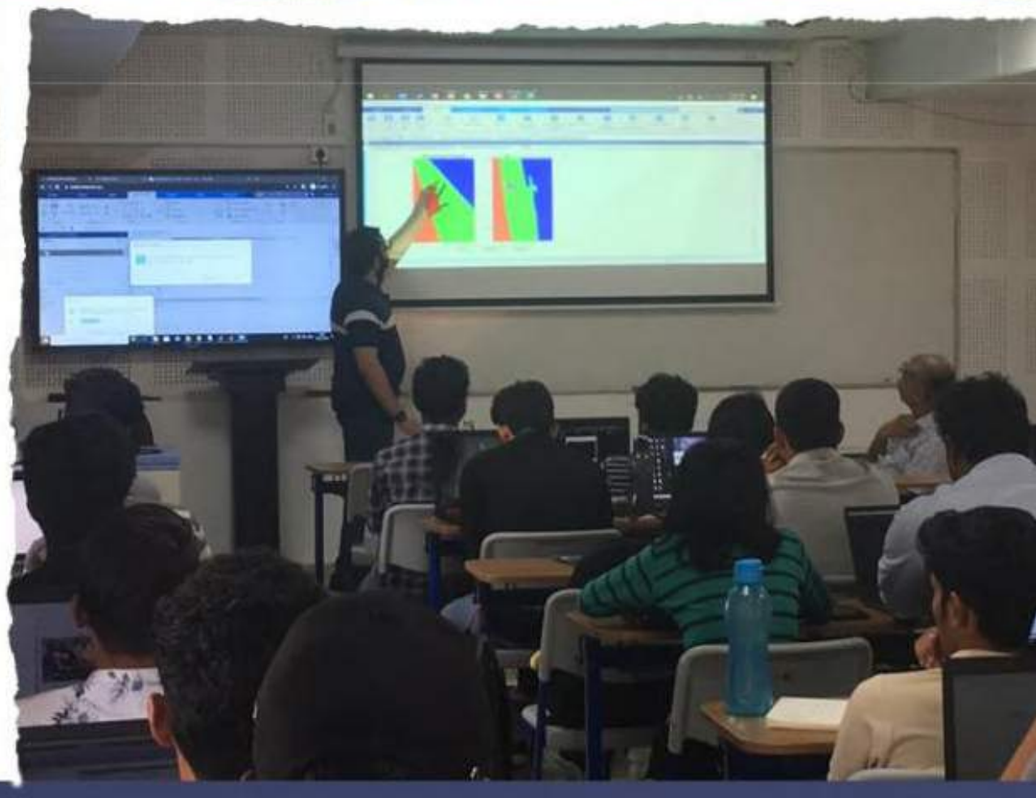
Goa University is recognised by the UGC and consistently ranked in top 100 in India by NIRF (Government of India), QS (India rank), India Today and the Week. Goa University was established under the Goa University Act of 1984 (Act No. 7 of 1984) and commenced operations on 1 June 1985. The university provides higher education in the Indian state of Goa. It is located on Taleigao Plateau overlooking Zuari estuary on a picturesque campus spread over 402 acres with state-of-the-art infrastructure such as faculty blocks, administrative building, library, sports facilities, student hostels, bank, post-office, staff quarters, etc. Campus-Wide Internet connectivity with strong bandwidth is available for all 24 hours a day.

Since 1985 Goa University offers graduate and post-graduate studies and research programmes. Over the past 35 years, the University has steadily expanded its reach, both in terms of the number of affiliated colleges - professional and general education, as well as the diversity of courses offered. The University, on its campus, has 1 Centre, 16 Departments and 5 Schools. The formation of schools has been done with amalgamation of traditional departments to allow organic evolution of new courses. They offer programmes leading to Undergraduate degree, Masters degree , M.Phil. and Ph.D. degree in various disciplines.

Vice-Chancellor's Message

Prof. Varun Sahni
D.Phil. (University of Oxford)
Vice-Chancellor, Goa University

Within Goa University, Goa Business School is the embodiment of vibrant and productive synergy between the academic disciplines of Commerce, Computer Science, Economics and Management. With its wide array of academic degrees – M.Com., MBA, MCA, MA and Ph.D. – GBS is in every sense our University's School of Data and Decision Sciences. I am delighted to inaugurate the next big step in GBS's mission to provide novel educational opportunities of the highest quality to learners in Goa and further afield. **Our new M.Sc. programme in GBS will provide a wonderful new opportunity for school leavers with strong Mathematics and quantitative skills.** Students will have the opportunity to earn a B.Sc. degree in Data Science in three years or to carry on for two more years to earn an Integrated M.Sc. degree in Computer Science, Economics, Decision Science or Data Science. This is a truly innovative programme and I congratulate the Dean and faculty members of GBS for designing and launching it. We warmly welcome the students who will join this programme as the pioneer batch.



About **Goa Business School**

The disciplines that form the Goa Business School are:

Commerce (established in 1988)

Computer Science & Technology (1987)

Economics (1968 Centre for Post-Graduate Instruction & Research at Goa - CPIR - affiliated to then University of Bombay) and

Management Studies (1988).

The amalgamation allows the faculty and research students to discover new synergies that remained hidden within department silos and showcase our strengths in research and teaching in these areas together. The students passing out from these departments have been absorbed in the industry within India and abroad in the past. The school has established good contacts with the industry and business enterprises in and outside Goa for corporate internship and placement services. The programmes provide comprehensive knowledge and practice covering various aspects needed in the industry.

Dean's Message

Prof. M. S. Dayanand,
Ph.D. (Goa University)
Professor of Management Studies,
Dean, Goa Business School,
Goa University

Data Sciences and Data Management will be the cutting edge tools for all kinds of developments in almost all fields in future. Keeping in mind this futuristic scenario Goa Business School, Goa university has started a five year integrated programme leading to a Master of Science in Data Science, Decision Science, Computer Science and Economics.

The value of data and its management has become exceptionally important for decision making in various fields. In order to excite the young minds into taking up a career in this field, the Goa Business School decided to encourage the brilliant youngsters to join after the completion of HSSC.

I wish all prospective students of this programme a very enriching and wonderful learning experience.

WHY AN **INTERDISCIPLINARY PROGRAMME** ?

With the saturation of each discipline, the borders that previously defined each of them seem to be diminishing and newer hybrid subjects are being formed.

Employers now seek candidates with varied expertise which none of the traditional academic programmes offer.

During the course of this programme, the student will develop the ability to:

1. **Identify, formulate & solve complex problems in various domains by applying the scientific principles of computation & mathematics.**
2. **Analyze and interpret data, and use scientific judgments to draw conclusions.**
3. **Acquire and apply new knowledge as needed, using appropriate learning strategies.**
4. **Communicate effectively to various stakeholders.**

PROGRAMME **OVERVIEW**

1 **Programme Objective:**	The programme will provide a broad-based education to students who wish to explore interdisciplinary approaches to scientific enquiry.
2 **Degrees to be Awarded:**	Master of Science (M.Sc.) in (subject specialization) and Bachelor of Science (B.Sc.) in Data Science.
3 **Subject Specializations:**	Computer Science, Data Science, Decision Science and Economics.
4 **Duration:**	5 years (Integrated) with an exit option after 3 years with a B.Sc. in Data Science.

PROGRAMME **HIGHLIGHTS**

1 **Multi-disciplinary outlook:**	This is the unique character of this programme. It offers the student a broad-based orientation in multiple-disciplines and analytical skills.
2 **Focus:**	Programme has a good balance of industry as well as research focus qualifies them unique positions across various employment verticals wherein such candidates are very scarce.
3 **Liberal Structure:**	A student can acquire competencies in multiple subjects with the flexibility offered by the programme.
4 **Internships:**	Students undergo 2 mandatory internships with credit transfer.
5 **Dedicated Project / Dissertation:**	Students have the opportunity to develop their writing and research capability while working on their project/dissertation.

PROGRAMME **STRUCTURE**

There are 2 stages to the programme:

1. **UG Stage (years 1 – 3)**
2. **PG Stage (years 4 – 5)**

Total duration of the programme is **5 years (10 semesters)**. The courses are **common across first 2.5 years (5 semesters)**. Students **choose their domain specialization in the 6th semester.** Students could **further change their specialization in the forth year** provided they fulfill course pre-requirements **by opting electives of target specialization in sixth semester.**

On completion of the third year, the student has an **option to exit the programme with a B.Sc. degree in Data Science.** In the fourth year, a student will choose her/his discipline.

Entry with 12th Standard

Stage	Year	Semester	Subject Specialization	Programme Completion
UG	1	1	Common Subjects as per syllabus. **(Data Science by default)**	Students have an **exit option after completion of 3rd year with B.Sc. in Data Science**
		2		
	2	3		
		4		
	3	5		
		6	Students **choose one** between the four offered **specializations in the 6th sem.**	After completion of 5 years, **exit with M.Sc. in (specialization)** and **B.Sc. in Data Science**
PG	4	7		
		8		
	5	9		
		10		

SUBJECTS AND CREDITS (for illustration)

Semester I	Credits	Semester II	Credits
Management Concepts & Organizational Behaviour	4	Business Analytics	2
Environment, Economy and Society	4	Microeconomics	4
Probability & Statistic I	4	Linear Algebra	4
Programming in Python	6	Algorithms and Data Structures	6
Soft Skills	2	Probability & Statistics II	4
Perspective Building Course	2	Soft Skills	2
Semester III	**Credits**	**Semester IV**	**Credits**
Marketing Analysis	4	Machine Learning	6
Deductive and Inferential Mathematics	4	Data Modelling and Visualization	4
Macroeconomics	4	Linear Programming & Optimization	4
Database Management Systems	6	Econometrics I	4
Soft Skills	2	Soft Skills	2
Perspective Building Course	2	Perspective Building Course	2
Semester V	**Credits**	**Semester VI ***	**Credits**
Computer Organization & Operating Systems	6	Domain	12
Programming in C	6	Electives	14
Data Science Toolkit	4		
Strategic Management	4		
Econometrics II	4		
Perspective Building course	2		
Semester VII	**Credits**	**Semester VIII**	**Credits**
Discipline	24	Discipline	24
Semester IX *	**Credits**	**Semester X**	**Credits**
Discipline	16	Project/Dissertation/Electives	16
Total Credits (5 years) = 220			

*** semester includes an audited internship**

ELIGIBILITY AND ADMISSION

To be eligible for admission to the 5-year M.Sc. Integrated programme a candidate should satisfy ALL of the following criteria:

- Minimum of 55% for general candidates in higher secondary (or equivalent) with a relaxation as per government rules for reserved categories
- Mathematics as a subject in higher secondary (or equivalent).
- The candidate must score minimum 30% with negative marks in the entrance test with 5% relaxation for reserved categories. The admission to the programme shall be strictly based on the Merit List prepared based on the Aptitude Entrance Test

NUMBER OF SEATS

A batch size of **maximum 50 seats (including EWS seats).**

IMPORTANT DATES

For dates related to application, entrance exam and admission, kindly check our website **www.unigoa.ac.in** regularly.

MANDATORY REQUIREMENTS

- Learners should **own a personal laptop** for the course of this programme.
- Laptop Specifications: **Core i5 Processor with 8GB RAM (or equivalent)** to start with.

FEES

The fee for the program is INR 17,890/- for the first year

CONTACT INFORMATION

Programme Director, MSc. - Email ID: msci@unigoa.ac.in,
Ph. No. 8669609314/ 8669609191

Details of Entrance Test

There are 2 broad subject areas covered in the entrance test - Mathematics, Analytical Ability & Logical Reasoning. The duration of the test will be 120 minutes. The distribution of questions will be as follows:
The question paper will contain 80 multiple choice questions with following distribution:
Mathematics (50 Questions)
Analytical Ability & Logical Reasoning (30 Questions)

ELIGIBLE CANDIDATES FOR ENTRANCE TEST

After scrutiny of applications, a list of candidates who will have to appear for the entrance test, will be made available on the University website, www.unigoa.ac.in. However, the eligibility for admission to the Integrated M.Sc. programme will be subject to the candidate fulfilling all eligibility criteria.

The test will be held on-line and separate intimation about the entrance test shall be sent via email.

The candidates shall have to produce a valid photo identity card such as Voter's card, Driving licence, College Identity Card, Aadhar card, Passport, PAN card, for identification and verification at the beginning of the test.

The list of candidates selected for admission to Integrated M.Sc. programme will be displayed on the Goa University website.

. MATHEMATICS: (50 questions) .

Set Theory: Concepts of sets – Union, Intersection, Cardinality, Elementary counting; permutations and combinations.

Probability and Statistics: Basic concepts of probability theory, Dependent and Independent events, frequency distributions, measures of central tendencies and dispersions.

Algebra: Fundamental operations in algebra, expansions, factorization, simultaneous linear/ quadratic equations, indices, logarithms, arithmetic, geometric and harmonic progressions, determinants and matrices.

Coordinate Geometry: Rectangular Cartesian coordinates, distance formulae, equation of a line, and intersection of lines, pair of straight lines, equations of a circle, parabola, ellipse, and hyperbola.
Calculus: Limit of functions, continuous function, differentiation of function, tangents and normals, simple examples of maxima and minima. Integration of function by parts, by substitution and by partial fraction; definite integrals, applications of definite integrals to areas.
Vectors: Position vector, addition and subtraction of vectors, scalar and vector products and their applications to simple geometrical problems and mechanics.
Trigonometry: Simple identities, trigonometric equations properties of triangles, solution of triangles, heights and distances, general solutions of trigonometric equations

ANALYTICAL ABILITY AND LOGICAL REASONING: (30 questions) .

The questions in this section will cover analytical and logical reasoning and based on Series, Relationships, Classification, Coding, Venn diagrams, Permutations and Combinations and inference

SAMPLE QUESTIONS

ANALYTICAL ABILITY AND LOGICAL REASONING

1. Unscramble the letters of words and find the odd one out.
(a) TLAES (b) KOBO (c) PPREA (d) NCEPLI

2.A man works for 2 days and then rests for one day, then works for 2 days and rests for one day and so on. For everyday he works, he earns Rs. 100. How much will he earn from Monday to Saturday?
(a) Rs. 200 (b) Rs. 300 (c) Rs. 400 (d) Rs. 500

3. If RUNNER is coded by SUMMER, the code for WINTER will be:
(a) XIMSER (b) VINTER (c) SINVER (d) VIOUER

4.Ram started his journey at 9.00 a.m. at 8 km/hour. Shyam started from the same spot in the same direction at 9.30 a.m. at 10 km/hour. Shyam overtakes Ram at :
(a) 11.00 a.m. (b) 12.30 p.m. (c) 12.00 noon (d) 11.30 a.m.

5. VCL, UEI, TGF, ?
(a) SJC (b) THI (c) SIC (d) RHD

MATHEMATICS

1. If a, b, c, d, e, f are in A.P., then e – c is equal to
(a) 2(c – a) (b) 2(d – c) (c) 2(f – d) (d) d – c

2. The distance between the lines 5x – 12y + 2 = 0 and 5x – 12y – 3 = 0 is
(a) 3/13(b) 5/13 (c) 7/13 (d) 1/13

3.A square park is surrounded by a path of uniform width 2 metres all round it. The area of the path is 288 sq. metres. The perimeter of the park is
(a) 142 m (b) 128 m (c) 136 m (d) 118 m

4. Which of the following is INCORRECT?
(a) |a+b| <= |a|+|b| (b) |a-b| <= |a|+|b| (c) |a-b| <= |a|-|b| (d) |a-b|=0 a=b

5.The value of cos(2π/7) + cos(4π/7)+cos(6π/7
(a) 1 (b) -1 (c) 1/2 (d) -1/2