

Course Structure

**BTech. in Mathematics and Scientific Computing
(From Batch 2023)**

**ABV-Indian Institute of Information Technology & Management,
Gwalior**

4 year (8 semester) B.Tech. in Mathematics and Scientific Computing

Total credits 165

Semester-1

Sl No	Code	Name of the course	L-T-P	Credit
1.	EE101	Fundamentals of Electrical and Electronics	3-0-2	4
2.	PH101	Engineering Physics	3-0-2	4
3.	MA101	Engineering Mathematics	3-1-0	4
4.	EE102	Engineering Design Principles	2-0-2	3
5.	CS101	Computer Programming	3-0-2	4
6.	HS101	Freshman Skills	2-0-0	2
7.	HS102	Sports and Physical Education	0-1-2	2
Total Credits				23

Semester-2

Sl No	Code	Name of the course	L-T-P	Credit
1.	EE103	Digital Electronics	3-0-2	4
2.	MA102	Probability and Statistics	3-1-0	4
3.	CS102	Data Structures	3-0-2	4
4.	EE104	Hardware Workshop	1-0-4	3
5.	IT103	Object Oriented Programming	3-0-2	4
6.	HS102	Ecology and Environment Sciences	2-0-0	2
7.	CS104	Mobile Application Technologies	0-1-2	2
Total Credits				23

*Summer Project or MOOC (Optional) of 2 credits

Exit after 1st year (46 credits) leads to “Certificate in (Engineering Sciences)”

Semester-3

Sl No	Code	Name of the course	L-T-P	Credit
1.	HS201	Indian Culture, Ethics and Moral Values	2-0-0	2
2.	MA201	Discrete Mathematical Structures	3-1-0	4
3.	MA202	Differential Equations and Integral Transforms	3-0-0	3
4.	MA203	Real and Functional Analysis	3-0-0	3
5.	CS203	Design and Analysis of Algorithms	3-0-2	4
6.	CS204	Database Systems	3-0-2	4
7.	MA204	Complex Analysis	3-0-0	3
Total Credits				23

Semester-4

Sl No	Code	Name of the course	L-T-P	Credit
1.	HS202	Entrepreneurship and Innovation	2-0-0	2
2.	CS207	Operating Systems	3-0-2	4
3.	CS208	Software Engineering	3-0-2	4
4.	CS210	Microprocessor and Embedded Systems	3-0-2	4
5.	MA204	Multivariate Data Analysis	3-0-2	4
6.	MA205	Advanced Numerical Methods	3-0-0	4
Total Credits				21

*Summer Project-1

Exit after 2nd year (90 credits) leads to “Diploma in Mathematics & Scientific Computing”

Semester-5

SI No	Code	Name of the course	L-T-P	Credit
1.	MA301	Fuzzy Sets and Their Applications	3-0-0	3
2.	MA302	Trustworthy Artificial Intelligence	3-0-2	4
3.	MA303	Vector Calculus	3-0-0	3
4.	CS303	Computer Graphics	3-0-0	3
5.	MA304	Software Reliability	3-0-0	3
6.	MA0XX	Department Elective-1		3/4
7.	MA0XX	Department Elective-2		3/4
8.	MS301	Business Economics	3-0-0	3
Total Credits				25-27
MOOC Course (Optional)				2

Semester-6

SI No	Code	Name of the course	L-T-P	Credit
1.	MA305	Modelling and Simulation	3-0-2	4
2.	MA306	Optimization Techniques	3-1-0	4
3.	MA307	Statistical Inference	3-1-0	4
4.	MA308	Machine Learning	3-0-0	3
5.		Multidisciplinary/Open Elective-1/MOOC		3/4
6.		Department Elective -3		3/4
7.	ENXXX	Art of Engineering Research	3-0-0	3
Total Credits				24-26
MOOC, NPTEL Course (Optional)				2

* Colloquium of 2 credits in summer semester (MOOC, NPTEL etc. in lieu of colloquium)

Exit after 3rd year (133 credits) leads to “BSc in Mathematics & Scientific Computing”

Semester-7

SI No	Code	Name of the course	L-T-P	Credit
1	MA401	Quantum Computing	3-0-0	3
2	MA402	Data Mining and Data warehousing	3-0-2	4
3	MA403	Advanced Graph Theory	3-0-0	3
4	MA404	Modern Cryptography	3-0-2	4
5		Multidisciplinary/Open Elective-2/MOOC		3/4
6	MA0XX	Department Elective-4		3/4
7		Colloquium	0-0-4	2
Total Credits				22-24

Semester-8

SI No	Code	Name of the course	L-T-P	Credit
1.	MA498	Internship/ BTech Project	0-0-24	12
2.		Multidisciplinary/Open Elective- 3/MOOC		3/4
Total Credits				15-16

Exit after 4th year (168-175 credits) leads to “B.Tech. in (Mathematics & Scientific Computing)

Minor in Mathematics and Scientific Computing

Sl No	Code	Name of the course	L-T-P	Credit
1.	MA202	Advanced Numerical Methods	3-0-2	4
2.	MA203	Real and Functional Analysis	3-0-0	3
3.	MA204	Multivariate Data Analysis	3-0-2	4
4.	MA301	Fuzzy Sets and Their Applications	3-0-0	3
5.	MA303	Modelling and Simulation	3-0-2	4
6.	MA305	Statistical Inference	3-1-0	4

NOTE: A Minor in Mathematics and Scientific Computing is open to student(s) from other discipline subject to successful completion of the above credits with a minimum of 6 CGPA. A student can opt for the courses depending on the convenience. For example: MA301 and MA303 are offered in the 5th semester. A student can opt for these courses along with his regular courses in 5th semester OR he can take one of the two courses in 5th semester and the other in his 7th semester. This reduces the credit load in a particular semester. In addition, if a given course is floated in summer semester, the student can also opt for the same in summer semester.

Elective Choices in (Mathematics & Scientific Computing)

Sl.	Code	Name of the course	L-T-P	Credit
1.	MA001	Parallel Computing	3-0-2	4
2.	MA002	Computational Biology	3-0-0	3
3.	MA003	Stochastic Processes and Applications	3-1-0	4
4.	MA004	Topology and Differential Geometry	3-1-0	4
5.	MA005	Data Economics	3-0-0	3
6.	MA006	Intuitionistic Fuzzy Sets and Applications	3-1-0	4
7.	MA007	Financial Mathematics	3-0-0	3
8.	MA008	Cluster Computing	3-0-0	3
9.	MA009	Digital Image Processing	3-0-2	4
10.	MA010	Big Data Analytics	3-0-2	4
11.	MA011	Wavelet Analysis	3-0-0	3
12.	MA012	Introduction to Game Theory	3-0-0	3
13.	MA013	Computer Vision	3-0-2	4
14.	MA014	Business Statistics and Industrial Applications	3-1-0	4
15.	MA015	Distributed Computing	2-0-2	3
16.	MA016	Robotics	3-1-0	4