

Maulana Azad National Institute of Technology, Bhopal-462003
DEPARTMENT OF Mathematics, Bioinformatics & Computer Applications
SCHEME FOR B. Tech. and M. Tech. (Mathematics and Data Science)
(First Year Only)
Proposed

First Semester

(Section A, B, C, D & E)/(Section F, G, H, I & J)

Course Code	Course Name	Periods per week			Credits
		L	T	P	
MTH101	Mathematics 1	3	1	-	4
PHY102/CHY 107	Physics/Engineering Chemistry	3	-	-	3
CE103/ EE108	Engineering Mechanics/Basic Electrical & Electronics Engineering	3	1	-	4
ME104/ME109	Engineering Graphics/ Manufacturing Science	1	-	-	1
CSE105/CHY 110	Computer Programming & Problem Solving/Environmental Science	2	-	-	2
HUM106/BSE111	Communication Skill/Biology for Engineers	1/2	-	-	1/2
CE121/EE125	Engineering Mechanics/ Basic Electrical & Electronics Engineering	-	-	2	1
PHY122/CHY 126	Physics/Engineering Chemistry Laboratory	-	-	2	1
ME 123/ME 127	Engineering Graphics/Manufacturing Science Laboratory	-	-	2	1
CSE124/HUM128	Computer Programming/ Language Laboratory	-	-	2	1
SAS 141/SAS142	(Life Skill Management /Physical)/(NSS/Yoga)	-	-	2	1
Total Hours=25/26		13/14	2	10	20/21
NCC151	National Cadet Corps I	1	1	-	2

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Second Semester

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Course Code	Course Name	Periods per week			Credits
		L	T	P	
MTH102	Mathematics 2	3	1	-	4
CHY107/PHY102	Engineering Chemistry/Physics	3	-	-	3
EE108/CE103	Basic Electrical & Electronics Engineering/Engineering Mechanics	3	1	-	4
ME109/ ME 104	Manufacturing Science/Engineering Graphics	1	-	-	1
CHY110/CSE 105	Environmental Science Computer/Programming & Problem Solving	2	-	-	2
BSE111/HUM106	Biology for Engineers/Communication Skill	2/1	-	-	2/1
CHY125/PHY121	Engineering Chemistry/Physics Laboratory	-	-	2	1
EE126/CE122	Basic Electrical & Electronics Engineering/Mechanics Laboratory	-	-	2	1
ME 127/ME123	Manufacturing Science Engineering/Graphics Laboratory	-	-	2	1
HUM128/CSE124	Language Laboratory/Computer Programming	-	-	2	1
SAS 143/SAS144	(NSS/Yoga)/(Life Skill Management/Physical)	-	-	2	1
Total Hours=26/25		14/13	2	10	21/20
NCC151	National Cadet Corps I	1	1	-	2

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THIRD SEMESTER:

First Year Credits (Cumulative) 41

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
HUM251	Fundamentals of Entrepreneurship	3	-	-	3
MDS211	Discrete Mathematics	3	-	-	3
MDS212	Modern Algebra	3	-	-	3
MDS213	Computer Architecture	3	-	-	3
MDS214	Operating System	3	-	-	3
MDS215	Data Structures & Algorithms	3	-	2	4
MDS216	Programming Lab in JAVA			4	2
MDS217	Professional Practices		2	-	2
	Minor-1	3	-	-	3*
Total Hours=26		18	2	6	23
Total Credits (Cumulative)					64
Additional Subject:-National Cadet Corps (NCC)					
NCC251	National Cadet Corps III	1	5	1	7
Total Credits (Cumulative)					11

FOURTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
ME252	Fundamental of Design Methods	2	1	-	3
MDS221	Probability & Statistics	3	-	-	3
MDS222	Linear Algebra	3	-	-	3
MDS223	Analysis and Design of Algorithms	3	-	-	3
MDS224	Database Management System	3	-	-	3
MDS225	Computer Networks	3			3
MDS226	Programming Lab in Python			4	2
MDS227	Project Based Lab-I (Design)	-	-	4	2
	Minor-2	3	-	-	3*
Total Hours=26		17	1	8	22
Total Credits (Cumulative)					86
Additional Subject:-National Cadet Corps (NCC)					
NCC252	National Cadet Corps IV	2	-	1	3
Total Credits (Cumulative)					14

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FIFTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
MDS311	Statistical Data Analysis	3	-	-	3
MDS312	Numerical Analysis	3	-	-	3
MDS313	Cryptography	3	-	-	3
MDS314	Object Oriented Programming C++	3	-	-	3
MDS315	Artificial Intelligence & Neural Networks	3	-	-	3
MDS316	Programme Elective-1(A)	3	-	-	3
MDS317	Programming Lab in C++	-	-	4	2
MDS318	Project Lab (Development)	-	-	4	2
MDS319	Internship/Industrial Training	-	-	4	2
	Minor-3	3	-	-	3*
Total Hours=30		18	-	12	24
Total Credits (Cumulative)					110
Additional Subject:-National Cadet Corps (NCC)					
NCC351	National Cadet Corps V	1	5	1	7
Total Credits (Cumulative)					21

SIXTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
ME351	Engineering Management	3	-	-	3
MDS321	Optimization Techniques	3	-	-	3
MDS322	Graph Theory and Algorithms	3	-	-	3
MDS323	Machine Learning	3	-	-	3
MDS324	Data Mining & Predictive Data Analysis	3	-	-	3
	Programme Elective-2(A)	3	-	-	3
MDS325	Programming Lab in Tableau/ MATLAB	-	-	6	3
MDS326	Project based Learning: Implementation			4	2
	Minor-4	3	-	-	3*
Total Hours=28		18	-	10	23
Total Credits (Cumulative)					133
Additional Subject:-National Cadet Corps (NCC)					
NCC352	National Cadet Corps VI	2	-	1	3
Total Credits (Cumulative)					24

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SEVENTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
HUM451	Engineering Economics and IPR	3	-	-	3
MDS411	Deep Learning	3	-	-	3
MDS 412	Programme Elective-3(A) or (NPTEL/SWAYAM Courses)	3	-	-	3
	Programme Elective-4(A) or (NPTEL/SWAYAM Courses)	3	-	-	3
	OpenElective-1(C)	3	-	-	3
	Lab-1	-	-	2	1
MDS413	Project Based Lab-2 (Project Documentation)	-	-	4	2
MDS414	Industrial/FieldTraining	-	-	4	2
	Minor-5	3	-	-	3*
Total Hours=25		15	-	10	20
Total Credits (Cumulative)					153

EIGHTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
MDS 421	Major Project	-	-	16	8
MDS 422	Internship				
MDS 423	General Proficiency				1
MDS 424	Programme Elective-5(A) (NPTEL/SWAYAM Courses only)	3	-	-	3
	Programme Elective-6(A) (NPTEL/SWAYAM Courses only)	3	-	-	3
Total Hours=22		6	-	16	15
Total Credits (Cumulative)					168

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NINTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
MDS 511	Multivariate Statistical Analysis	3	-	-	3
MDS 512	Big Data Analytics	3	-	-	3
	Programme Elective-7(A)	3	-	-	3
	Programme Elective-8(A)	3	-	-	3
MDS 513	Industrial Training/ Field Training				2
MDS 514	Dissertation Phase-I(Design and Development)	-	-	20	10
Total Hours=32		12	0	20	24
Total Credits (Cumulative)					192

TENTH SEMESTER:

Course Code	Course Name	Scheme of Studies Periods per week			Credits
		L	T	P	
MDS521	Dissertation Phase – II (Implementation and Documentation)	-	-	40	20
Total Hours=40		-	-	40	20
Total Credits (Cumulative)					212

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LIST OF PROGRAMME ELECTIVES (GROUP A)

For III year [1(A) & 2(A)]

Elective 1(A)

MDS 351	Stochastic Process
MDS 352	Mathematical Image Processing
MDS 353	Integral Transform and Integral Equations
MDS 354	Mathematical Modeling and Simulation
MDS 355	Numerical Optimization
MDS 356	Differential Equations & Applications
MDS 357	Real Analysis
MDS 358	Mathematical Logic & Logic Programming
MDS 359	Number Theory
MDS 360	Fluid Dynamics
MDS361	Mathematical Thinking

Elective 2(A)

MDS 371	Application Development Using JAVA
MDS 372	Theory of Computation
MDS 373	Evolutionary Algorithms
MDS 374	Business Process Management
MDS 375	Parallel Computing
MDS 376	Application Development Using Python
MDS 377	Cloud Computing
MDS 378	Web Application Development
MDS 379	Petrinet Modeling
MDS 380	Computer Graphics

For IV year [3(A) ,4(A), 5(A) & 6(A)]

Elective 3(A) & 5(A)

MDS 451	Advanced Optimization Techniques
MDS 452	Numerical Linear Algebra
MDS 453	Topology
MDS 454	Quantum Computing
MDS 455	Image Processing
MDS 456	Advanced Numerical Methods
MDS 457	Measure Theory
MDS 458	Econometrics
MDS 459	Stochastic Process and Simulation
MDS 460	Coding Theory

Elective 4(A) & 6(A)

MDS 471	Data Visualization
MDS 472	Statistical Natural Language Processing
MDS 473	Mobile Computing
MDS 474	Business Intelligence
MDS 475	Information Theory
MDS 476	Computer Vision
MDS 477	Customer Relation Management
MDS 478	Internet of Things
MDS 479	Knowledge Management

For V year [7(A) & 8(A)]**Elective7(A)**

MDS 551	Financial Mathematics
MDS 552	Functional Analysis
MDS 553	Queueing Models for Computer and Communication Systems
MDS 554	Quantum Cryptography
MDS 555	Wavelets: Theory and Applications
MDS 556	Calculus of Variations
MDS 557	Finite Element Methods
MDS 558	Fuzzy Sets Theory and Applications
MDS 559	Game Theory

Elective 8(A)

MDS 571	Information Retrieval
MDS 572	Modeling Techniques in Predictive Data Analysis
MDS 573	Natural Language Processing
MDS 574	Process Aware Information System
MDS 575	Decision Science
MDS 576	Next Generation Networks
MDS 577	Enterprise Resource Planning
MDS 578	Multimedia & Virtual Reality