

B.N.M. Institute of Technology

An Autonomous Institution under VTU

For Internal Communication

Department of Artificial Intelligence and Machine Learning Scheme of Teaching for 2021-25 batch - Choice Based Credit System (CBCS) Total Credits – 120 III Semester B.E. Curriculum

Sl. No	Type of Course	Course Code	Course Title	Teaching Department	Hours per week				Subject Contact Hours	Credits	Examination		
					Lecture (L)	Tutorial (T)	Practical (P)	Project (J)			CIA	SEA	Total
1	BSC	21MAI131	Fourier Transform, Numerical methods and Linear Algebra	Mathematics	2	2	-	-	4	3	50	50	100
2	PCC	21AML132	Computer Organization and Architecture	AI and ML	3	-	-	-	3	3	50	50	100
3	PCC	21AML133	Operating System	AI and ML	3	-	-	-	3	3	50	50	100
4	PCI	21AML134	Data Structures Using C	AI and ML	2	2	2	-	6	4	50	50	100
5	PCI	21AML135	Microcontroller and Embedded Systems	AI and ML	3	-	2	-	5	4	50	50	100
6	PBL	21AML136	Object Oriented Programming using Java	AI and ML	-	-	2	2	4	2	50	50	100
7	HSS	21EVS137	Environmental Studies	HSS	-	2	-	-	2	1	100	-	100
8	AEC	21SFT138	Soft Skill - 1	HSS	-	-	2	-	2	1	100	-	100
9	PBL	21AML139	Innovative Project Lab	AI and ML	-	-	-	2	2	1	100	-	100
Total					13	6	8	4	31	22	600	300	900

BSC - Basic Science Course

PCL – Professional Core Laboratory

PBL - Project Based Learning

AEC - Ability Enhancement Course

Activity

PCC- Professional Core Course

PCE - Professional Core Elective

INT - Internship

UHV - Universal Human Values

PCI-Professional Core Integrated

POE- Professional Open Elective

PRJ – Project Work

HSS - Humanity and Social Science

CIA: Continuous Internal Assessment

SEA: Semester End Assessment

AICTE Activity Points to be earned by students admitted to BE day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other institutions and Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to BNMIT. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

Mathematics for Diploma Students

Course Code	Course Name	Teaching Department	L	T	P	J	Credits	CIA	SEA	Total
21MATDIP131	Bridge Mathematics - I	Mathematics	3	0	0	0	0	100	-	100

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Department of Artificial Intelligence and Machine Learning Scheme of Teaching for 2021-25 batch- Choice Based Credit System (CBCS) Total Credits – 120 IV Semester B.E. Curriculum

Sl. No.	Type of Course	Course Code	Course Title	Teaching Department	Hours per week				Subject Contact Hours	Credits	Examination		
					Lecture (L)	Tutorial (T)	Practical (P)	Project (J)			CIA	SEA	Total
1	BSC	21MAI141	Statistic, Probability and Graph Theory	Mathematics	2	2	-	-	4	3	50	50	100
2	PCI	21AML142	Machine Learning	AI and ML	3	-	2	-	5	4	50	50	100
3	PCI	21AML143	Database Management System	AI and ML	1	2	1	1	5	3	50	50	100
4	PCI	21AML144	Design and Analysis of Algorithms	AI and ML	2	2	2	-	6	4	50	50	100
5	PBL	21AML145	Python Programming and Applications	AI and ML	-	-	2	2	4	2	50	50	100
6	AEC	21CIP146	Constitution of India and Professional Ethics	HSS	-	2	-	-	2	1	100	-	100
7	HSS	21KAN147/ 21KAN1472	Kannada	HSS	-	2	-	-	2	1	100	-	100
8	AEC	21SFT148	Soft Skill-II	HSS	-	2	-	-	2	1	100	-	100
9	INT	21AML149	Internship – I/ IPL	AI and ML	-	-	2	2	4	2	100	-	100
Total					8	12	9	5	34	21	650	250	900

Internship-I: All the students registered to III year of BE shall have to undergo mandatory internal internship of 3 weeks during II semester or III semester vacation. Semester End Assessment will be conducted in IV semester and the prescribed credit will be included. Internship shall be considered as a head of passing and shall be considered for the award of degree.

Activity

AICTE Activity Points to be earned by students admitted to BE day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other institutions and Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to BNMIT. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

Mathematics for Diploma Students

Course Code	Course Name	Teaching Department	L	T	P	J	Credits	CIA	SEA	Total
21MATDIP141	Bridge Mathematics - II	Mathematics	3	0	0	0	0	100	-	100

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Sl. No	Type of Course	Course Code	Course Title	Teaching Department	Hours per week				Subject Contact Hours	Credits	Examination		
					Lecture (L)	Tutorial (T)	Practical (P)	Project (J)			CIA	SEA	Total
1	PCC	21AML151	Software Project Management and Finance	AI and ML	2	2	-	-	4	3	50	50	100
2	PCC	21AML152	Automata Theory and Computations	AI and ML	2	1	1	-	4	3	50	50	100
3	PCI	21AML153	Computer Networks & Security	AI and ML	3	-	2	-	5	4	50	50	100
4	PCI	21AML154	Artificial Intelligence	AI and ML	3	-	1	1	5	4	50	50	100
5	PBL	21AML155	Virtual Reality and Augmented Reality	AI and ML	-	-	2	2	4	2	50	50	100
6	POE	21AML156x	Open Elective - I	AI and ML	3	-	-	-	3	3	50	50	100
7	AEC	21AML157	Employability Skills - I	T & P	-	2	-	-	2	1	100	-	100
8	INT	21AML158	Internship-II/ IPL	AI and ML	-	-	2	2	2	2	100	-	100
Total					13	5	8	5	29	22	500	300	800

OPEN ELECTIVES:

Course Code	21AML1561	21AML1562	21AML1563	21AML1564
Course Title	Introduction to ML	Introduction to AI	Data Driven Decision Making	Sensors & Robotics

Internship-II: All the students registered to III year of BE shall have to undergo mandatory internship of 3 to 4 weeks during IV semester vacation. Semester End Assessment will be conducted in V semester and the prescribed credit will be included. Internship shall be considered as a head of passing and shall be considered for the award of degree.

Activity

AICTE Activity Points to be earned by students admitted to BE day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other institutions and Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to BNMIT. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

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VI Semester B.E. Curriculum

Sl. No.	Type of course	Course Code	Course Title	Teaching Department	Hours per week				Subject Contact Hours	Credits	Examination		
					Lecture (L)	Tutorial (T)	Practical (P)	Project (J)			CIA	SEA	Total
1	PCI	21AML161	Big Data Analytics	AI and ML	2	1	1	-	4	3	50	50	100
2	PCI	21AML162	Natural Language Processing	AI and ML	2	-	2	-	4	3	50	50	100
3	PCI	21AML163	Image Processing and Computer Vision	AI and ML	3	-	1	1	5	4	50	50	100
4	PBL	21AML164	Cloud Computing & Applications	AI and ML	-	-	2	2	4	2	50	50	100
5	PCE	21AML165x	Professional Elective – I	AI and ML	3	-	-	-	3	3	50	50	100
6	PCE	21AML166x	Professional Elective – II (MOOC)	AI and ML	3	-	-	-	3	3	50	50	100
7	POE	21AML167x	Open Elective - II	AI and ML	3	-	-	-	3	3	50	50	100
8	AEC	21AML168	Employability Skills - II	T & P	-	-	2	-	2	1	100		100
Total					16	1	8	3	28	22	450	350	800

OPEN ELECTIVES:

Course Code	21AML1671	21AML1672	21AML1673	21AML1674
Course Title	Big Data Analytics and Data Visualization	Natural Language Processing	Computer Vision	Virtual Reality & Augmented Reality

Activity

AICTE Activity Points to be earned by students admitted to BE day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other institutions and Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to BNMIT. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

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VII Semester B.E. Curriculum

Sl. No	Type of course	Course Code	Course Title	Teaching Department	Hours per week				Subject Contact Hours	Credits	Examination		
					Lecture (L)	Tutorial (T)	Practical (P)	Project (J)			CIA	SEA	Total
1	PCI	21AML171	Neural Networks and Deep Learning	AI and ML	2	-	2	-	4	3	50	50	100
2	PCE	21AML172x	Professional Elective – III	AI and ML	3	-	-	-	3	3	50	50	100
3	PCE	21AML173x	Professional Elective – IV (MOOC)	AI and ML	3	-	-	-	3	3	50	50	100
4	AEC	21AML174	Research Methodology and Intellectual Property Rights	AI and ML	-	2	-	-	2	1	100		100
5	AEC	21AML175	Entrepreneurial skill development	HSS	-	2	-	-	2	1	100		100
6	PRJ	21AML176	Project Work Phase – I	AI and ML	-	-	-	10	10	5	100		100
Total					8	4	2	10	24	16	450	150	600

Project Work Phase - 1: Based on the abilities of the students and recommendations of the mentor, a single discipline or a multidisciplinary project can be assigned to an individual student or to a group having not more than 4 students. In extraordinary cases, like the funded projects requiring students from different disciplines, the project student strength can be 5 or 6.

Activity

AICTE Activity Points to be earned by students admitted to BE day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other institutions and Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to BNMIT. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

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VIII Semester B.E. Curriculum

Sl. No.	Type of course	Course Code	Course Title	Teaching Department	Hours per week				Subject Contact Hours	Credits	Examination		
					Lecture (L)	Tutorial (T)	Practical (P)	Project (J)			CIA	SEA	Total
1	PCE	21AML181x	Professional Elective – V (MOOC)	AI and ML	3	-	-	-	3	3	50	50	100
2	INT	21AML182	Internship-III	AI and ML	-	-	8	-	8	4	50	50	100
3	PRJ	21AML183	Project Work Phase-II	AI and ML	-	-	-	20	20	10	50	50	100
Total					3	-	8	20	31	17	150	150	300

Project Work Phase - II: Based on the abilities of the students and recommendations of the mentor, a single discipline or a multidisciplinary project can be assigned to an individual student or to a group having not more than 4 students. In extraordinary cases, like the funded projects requiring students from different disciplines, the project student strength can be 5 or 6.

Internship - III: All the students admitted to III year of BE shall have to undergo mandatory internship of 6 months during the vacation of VI semester and during VII semester. End Assessment will be conducted in VIII semester and the prescribed credit shall be included. Internship shall be considered as a head of passing and shall be considered for the award of degree.

Activity

AICTE Activity Points to be earned by students admitted to BE day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other institutions and Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to BNMIT. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

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PROFESSIONAL ELECTIVE COURSES						
		6 th Semester		7 th Semester		8 th Semester
Sl. No.	Clusters	Elective – I	Elective – II (MOOC)	Elective – III	Elective – IV (MOOC)	Elective – V (MOOC)
1	<u>Intelligent Systems</u>	Recommender Systems	Internet of Things & Applications	Generative Adversarial Networks (GANs)	Large Language Models (LLMs) & Prompt Engineering	Cognitive Science
2	<u>Robotics</u>	Embedded Systems	Robotic Process Automation	Real Time Operating System	Robotics & Control: Theory & Practice	Computer Integrated Manufacturing System
3	<u>Gaming</u>	Computer Graphics & Applications	Game Theory and Programming	3D Graphics and Animation	Multimedia Tools & Applications	Game Design and Development
4	<u>Cryptography & Network Security</u>	Cryptography	Cyber Security & Privacy	Blockchain Technology	Ethical Hacking	Malware Analysis
5	<u>Data Science</u>	Data Warehousing & Data Mining	Data Science	R Programming	Predictive Analytics	Graph Neural Network
6	<u>General</u>	Mobile Application Development	Devops on AWS specialization	Operations Research	Machine Learning Operations for Productions (MLOPs)	High Performance Computing
7	<u>Management</u>	Strategic Management	Accounting & Finance for Engineers	Knowledge Management	Digital Marketing	Business Analytics