

**MVJ College of Engineering, Bengaluru**  
**(An Autonomous Institute)**

Affiliated to VTU, Belagavi, Approved by AICTE, New Delhi, Recognised by UGC with 2(f) & 12 (B),  
Accredited by NBA & NAAC

Scheme of Teaching and Examination 2021-22

**Department of Computer Science and Engineering (Data Science)**

Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Effective from the academic year 2021-22

**III SEMESTER**

Sl. No.	Course		Course Title	BOS	Teaching Hours/Week				Examination				Credits
					Theory/lecture	Tutorials	Practical/Drawing	Self-Study Component	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
	L	T			P	S							
1	BSC	MVJ21MA31B	Discrete Mathematical Structures and Probability	Maths	3	2	0	-	3	50	50	100	4
2	PCC	MVJ21CD32	Object Oriented Programming	CD	3	2	0	-	3	50	50	100	4
3	PCC	MVJ21CD33	Operating Systems	CD	3	0	0	-	3	50	50	100	3
4	IPCC	MVJ21CD34	Data Structures and Applications Lab	CD	3	0	2	Y	3	100	100	200	4
5	IPCC	MVJ21CD35	Analog and Digital Electronics and Lab	CD	3	0	2	-	3	100	100	200	4
6	HSMC	MVJ21CPH36	Constitution of India and Professional Ethics and Cyber law	Any Department	1	0	0	-	2	50	50	100	1
7	AEC	MVJ21CDA37	Software Design Engineering	CD	1	0	2	-	2	50	50	100	2
8	BSC	MVJ21MATDIP-I	Additional Mathematics-I	MA	1	2	0	-	3	50	50	100	-
<b>Total</b>					<b>17/18</b>	<b>4/6</b>	<b>6/6</b>	<b>-</b>	<b>19/22</b>	<b>450/500</b>	<b>450/500</b>	<b>900/1000</b>	<b>22</b>

**Note:** BSC: Basic Science Course, PCC: Professional Core Course, IPCC: Integrated Professional Core Course, HSMC: Humanity and Social Science & Management Course, AEC: Ability Enhancement Course, L: Lecture, T: Tutorial, P: Practical, S: Self Study, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation.

**Additional Mathematics-I:** The course is a non-credit mandatory course (NMC) prescribed for III semester lateral entry diploma holders admitted to BE programs. The successful completion of the program is mandatory for the award of the degree.

**IV SEMESTER**

Sl. No.	Course		Course Title	BOS	Teaching Hours/Week				Examination				Credits
					Theory lecture	Tutorials	Practical/ Drawing	Self-Study Components	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
	L	T			P	S							
1	BSC	MVJ21MA41E	Numerical and Statistical Methods	Maths	2	2	0	-	3	50	50	100	3
2	PCC	MVJ21CD42	Micro Controller and Embedded System	CD	3	0	0	-	3	50	50	100	3
3	PCC	MVJ21CD43	Computer Organization and Architecture	CD	3	0	0	-	3	50	50	100	3
4	IPCC	MVJ21CD44	Python Programming and Lab	CD	3	0	2	-	3	100	100	200	4
5	IPCC	MVJ21CD45	Design Analysis of Algorithms and Lab	CD	3	0	2	Y	3	100	100	200	4
6	HSMC	MVJ21SK46/BK46	Kannada	KAN	1	0	0	-	2	50	50	100	1
7	AEC	MVJ21CDA47	Linux Programming	CD	1	2	0	-	2	50	50	100	2
8	INT	MVJ21INT48	Summer Internship-I	Should be completed during the intervening period of II and III semesters. <b>Intra-College Internship</b>					-	-	-	2	
9	BSC	MVJ21MATDIP-II	Additional Mathematics-II	Maths	1	2	0	-	3	50	50	100	-
<b>Total</b>					<b>16/17</b>	<b>2/4</b>	<b>6/6</b>		<b>19/22</b>	<b>450/550</b>	<b>450/550</b>	<b>900/1000</b>	<b>22</b>

**Note:** **BSC:** Basic Science Course, **PCC:** Professional Core Course, **IPCC:** Integrated Professional Core Course, **HSMC:** Humanity and Social Science & Management Course, **AEC:** Ability Enhancement Course, **INT:** Internship, **L:** Lecture, **T:** Tutorial, **P:** Practical, **S:** Self Study, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation.

**Additional Mathematics-I:** The course is a non-credit mandatory course (NCCM) prescribed for III semester lateral entry diploma holders admitted to BE programs. The successful completion of the program is mandatory for the award of the degree.

**Summer Internship-I:** Viva voice will be conducted for the 03 weeks inter/intra institutional summer internship activities carried out during the intervening period of II and III semesters. The internship will be considered as a head of passing and will be considered for the award of degree. Those, who do not take up / complete the internship will be declared fail and will have to complete during subsequent examination after satisfying the internship requirements.

**V SEMESTER**

Sl. No.	Course		Course Title	BOS	Teaching Hours/Week				Examination				Credits
	Type	Code			Theory lecture	Tutorials	Practical/ Drawing	Self-Study Component	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	HSMC	MVJ21CD51	Software Engineering Management	CD	3	0	0	-	3	50	50	100	3
2	PCC	MVJ21CD52	Data Communication and Computer Networks	CD	3	0	0	-	3	50	50	100	3
3	IPCC	MVJ21CD53	Database Management Systems and Lab	CD	3	0	2	-	3	100	100	200	4
4	IPCC	MVJ21CD54	R Programming	CD	3	0	2	Y	3	100	100	200	4
5	PEC	MVJ21CD55X	Professional Elective – I	CD	3	0	0	-	3	50	50	100	3
6	HSMC	MVJ21ENV56	Environmental Studies	CV	1	0	0	-	2	50	50	100	1
7	AEC	MVJ21RMI57	Research Methodology & IPR	CD	1	2	0	-	2	50	50	100	2
8	UHV	MVJ21UHV58	Universal Human Values	CD	2	0	0	-	2	50	50	100	2
<b>Total</b>					<b>19</b>	<b>2</b>	<b>4</b>	<b>-</b>	<b>21</b>	<b>500</b>	<b>500</b>	<b>1000</b>	<b>22</b>

**Note: HSMC:** Humanity and Social Science & Management Course, **PCC:** Professional Core Course, **IPCC:** Integrated Professional Core Course, **PEC:** Professional Elective Course, **AEC:** Ability Enhancement Course, **UHV:** Universal Human Values, **L:** Lecture, **T:** Tutorial, **P:** Practical, **S:** Self Study, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation.

Course Code	Professional Elective – I
MVJ21IS551	Advanced JAVA
MVJ21IS552	Cloud computing
MVJ21IS553	Agile Technology
MVJ21IS554	Business Intelligence

**VI SEMESTER**

Sl. No.	Course		Course Title	BOS	Teaching Hours/Week				Examination			Credits	
					Theory lecture	Tutorials	Practical/ Drawing	Self-Study Components	Duration in Hours	CIE Marks	SEE Marks		Total Marks
	Type	Code			L	T	P	S					
1	HSMC	MVJ21CD61	Project Management With OOMD	CD	3	0	0	-	3	50	50	100	3
2	IPCC	MVJ21CD62	AI and Machine Learning	CD	3	0	2	-	3	100	100	200	4
3	IPCC	MVJ21CD63	Data Analytics	CD	3	0	2	Y	3	100	100	200	4
4	OEC	MVJ21CD64X	Open Elective-I	CD	3	0	0	-	3	50	50	100	3
5	OEC	MVJ21CD65X	MOOC Courses (Open Elective-II)	CD	A twelve-week course should be selected from online platforms like NPTEL/SWAYAM							3	
6	AEC	MVJ21CDA66	Angular JS	CD	0	0	2	-	2	50	50	100	1
7	PRJ	MVJ21CDMP67	Mini Project	CD	0	0	4	-	3	50	50	100	2
8	INT	MVJ21INT68	Summer Internship-II	CD	Completed during the intervening period of IV and V semesters				50	50	100	2	
<b>Total</b>					<b>10</b>	<b>4</b>	<b>10</b>	<b>-</b>	<b>18</b>	<b>450</b>	<b>450</b>	<b>900</b>	<b>22</b>

**Note: HSMC:** Humanity and Social Science & Management Course, **IPCC:** Integrated Professional Core Course, **OEC:** Open Elective Course, **AEC:** Ability Enhancement Course, **PRJ:** Project, **INT:** Internship, **L:** Lecture, **T:** Tutorial, **P:** Practical, **S:** Self Study, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation.

**Summer Internship-II:** Viva voice will be conducted for the 04 weeks Industrial/Govt./ NGO/ MSME/Rural Internship/Innovation/Entrepreneurship summer internship activities carried out during the intervening period of IV and V semesters. The internship will be considered as a head of passing and will be considered for the award of degree. Those, who do not take up / complete the internship will be declared fail and will have to complete during subsequent examination after satisfying the internship requirements.

Course Code	Open Elective-I
MVJ21CD641	Introduction to DS
MVJ21CD642	Introduction to Cyber security
MVJ21CD643	Java Programming
MVJ21CD644	DBMS

**VII SEMESTER**

Sl. No.	Course		Course Title	BOS	Teaching Hours/Week				Examination				Credits
					Theory lecture	Tutorials	Practical/ Drawing	Self-Study Components	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
	Type	Code			L	T	P	S					
1	IPCC	MVJ21CD71	Big Data and Hadoop	CD	3	0	2		3	100	100	200	4
2	PEC	MVJ21CD72X	Professional Elective-II	CD	3	0	0		3	50	50	100	3
3	PEC	MVJ21CD73X	Professional Elective-III	CD	3	0	0		3	50	50	100	3
4	OEC	MVJ21CD74X	Open Elective-III	CD	3	0	0		3	50	50	100	3
5	PRJ	MVJ21CDP75	Project Phase-I	CD	0	0	4		3	50	50	100	2
6	AEC	MVJ21CDA76	Ability Enhancement Course-4	CD	A four-week course should be selected from online platforms							1	
<b>Total</b>					<b>12</b>	<b>0</b>	<b>6</b>		<b>15</b>	<b>300</b>	<b>300</b>	<b>600</b>	<b>16</b>

**Note:** IPCC: Integrated Professional Core Course, PEC: Professional Elective Course, OEC: Open Elective Course, PRJ: Project, AEC: Ability Enhancement Course, L: Lecture, T: Tutorial, P: Practical, S: Self Study, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation.

Course Code	Professional Elective-II	Course Code	Professional Elective-III	Course Code	Open Elective-II
MVJ21CD721	Block Chain Technology	MVJ21CD731	Internet of Things	MVJ21CD741	Cloud Computing
MVJ21CD722	Deep Learning	MVJ21CD732	Natural Language Processing	MVJ21CD742	Introduction to AI
MVJ21CD723	Augmented Reality	MVJ21CD733	Data Security and Privacy	MVJ21CD743	Python Programming
MVJ21CD724	Data Mining and Warehousing	MVJ21CD734	Cryptography and Network Security	MVJ21CD744	Introduction to Big Data

**VIII SEMESTER**

Sl. No.	Course		Course Title	BOS	Teaching Hours/Week				Examination				Credits
					Theory lecture	Tutorials	Practical/ Drawing	Self-Study Components	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
	L	T			P	S							
1	PRJ	MVJ21CDP81	Project Phase-II	CD	-	-	20	-	3	50	50	100	10
2	INT	MVJ21INT82	Research /Industrial Internship	CD	Should be completed in 24 weeks, beginning after the sixth semester, and continuing through the seventh and eighth semesters.				3	50	50	100	5
3	SEM	MVJ21CDS83	Seminar	CD	-	-	2	-	-	100	-	100	1
<b>Total</b>					-	-	22	-	6	200	100	300	16

**Note:** PRJ: Project, INT: Internship, SEM: Seminar, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation.

**Research/Industrial Internship:** Viva voice will be conducted for the 24 weeks Research/Industrial/Rural Internship activities carried out during beginning after the sixth semester test and continuing through the seventh and eighth semesters. The internship will be considered as a head of passing and will be considered for the award of degree. Those, who do not take up / complete the internship will be declared fail and will have to complete during subsequent examination after satisfying the internship requirements.