



# ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

## B. Tech. Scheme of Examination & Syllabus 2025-26

### Department of Artificial Intelligence

#### Annexure – I

#### CREDIT FRAMEWORK STRUCTURE

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	7	7							14
Engineering Science Course		6	6							12
Program Core Course (PCC)	Program Courses	2	2	13	10	7	4	6		44
Program Elective Course (PEC)						4	6	6	4	20
Multidisciplinary Minor (MDM)	Multidisciplinary Courses			2	3	3	3	3		14
Open Elective (OE) Other than a particular program						2	3	3		08
Vocational and Skill Enhancement Course (VSEC)	Skill Courses		2	1	1	2	2			08
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	1	1			2				04
Entrepreneurship/Economics/Management Courses				2	2					04
Indian Knowledge System (IKS)		2								02
Value Education Course (VEC)				2	2					04
Research Methodology	Experiential Learning Courses								4	04
Comm. Engg. Project (CEP)/ Field Project (FP)					2					02
Project							2	2		04
Internship/OJT									12	12
Co-curricular Courses (CC)	Liberal Learning Courses	2	2							04
<b>Total Credits (Major)</b>		<b>20</b>	<b>160</b>							

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### Department of Artificial Intelligence

#### GROUP I: SEMESTER I

Sr. No.	Course Category	CourseCode	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	BSC	25AI101T	Engineering Chemistry	2	-	-	2	10	10	30	50	23	1.5
2.	BSC	25AI101P	Engineering Chemistry Lab	-	-	2	1	-	25	25	50	25	-
3.	BSC	25AI102T	Linear Algebra and Calculus	3		-	3	20	20	60	100	45	3
4.	BSC	25AI102P	Linear Algebra and Calculus Lab			2	1		25	25	50	25	
5.	ESC	25AI103T	Logic building & Problem-Solving with C	3			3	20	20	60	100	45	3
6.	ESC	25AI103P	Logic building & Problem-Solving with C Lab			2	1		25	25	50	25	
7.	ESC	25AI104T	Digital Electronics	2			2	10	10	30	50	23	1.5
8.	PCC	25AI105T	Fundamentals of AI	2			2	10	10	30	50	23	1.5
9.	AEC	25AI106P	Business Communication Skills- I Lab	-	-	2	1	-	25	25	50	25	-
10	IKS	25AI107T	Indian Knowledge Systems <sup>#</sup>	2	-	-	2	10	10	30	50	23	1.5
11.	CC	25AI108T	Co-curricular Courses - I	2			2	-	50	-	50	23	-
<b>Total</b>				<b>16</b>	<b>0</b>	<b>8</b>	<b>20</b>	<b>80</b>	<b>230</b>	<b>340</b>	<b>650</b>		

# Course to be conducted online through NPTEL.

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### Department of Artificial Intelligence

#### GROUP I: SEMESTER II

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	BSC	25AI201T	Engineering Physics and Materials Science	2	-	-	2	10	10	30	50	23	1.5
2	BSC	25AI201P	Engineering Physics and Materials Science Lab	-	-	2	1	-	25	25	50	25	-
3	BSC	25AI202T	Statistics and Probability	3		-	3	20	20	60	100	45	3
4	BSC	25AI202P	Statistics and Probability Lab			2	1		25	25	50	25	
5	ESC	25AI203T	Python Programming	3			3	20	20	60	100	45	3
6	ESC	25AI203P	Python Programming Lab			2	1		25	25	50	25	
7	ESC	25AI204T	Computer Organization	2			2	10	10	30	50	23	1.5
8	PCC	25AI205T	AI Knowledge Representation and reasoning	2			2	10	10	30	50	23	1.5
9	AEC	25AI206P	Business Communication Skills – II Lab	-	-	2	1	-	25	25	50	25	-
10	SEC	25AI207T	Design Thinking <sup>#</sup>	2	-	-	2	10	10	30	50	23	1.5
11	CC	25AI208T	Co-curricular Courses – II	2	-	-	2	-	50	-	50	23	-
<b>Total</b>				<b>16</b>	<b>0</b>	<b>8</b>	<b>20</b>	<b>80</b>	<b>230</b>	<b>340</b>	<b>650</b>		

# Course to be conducted online through NPTEL.

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#### SEMESTER III

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	25AI301T	Discrete Mathematics	3	-	-	3	20	20	60	100	45	3
2.	PCC	25AI302T	Data Structures	3	-	-	3	20	20	60	100	45	3
3.	PCC	25AI302P	Data Structures Lab	-	-	2	1	-	25	25	50	25	
4.	PCC	25AI303T	Database Management Systems	3	-	-	3	20	20	60	100	45	3
5.	PCC	25AI303P	Database Management Systems Lab	-	-	2	1	-	25	25	50	25	
6.	PCC	25AI304P	Data Preprocessing & EDA Lab	-	-	2	1	-	25	25	50	25	
7.	PCC	25AI305P	Object Oriented Programming Lab	-	-	2	1	-	25	25	50	25	
8.	VEC	25ES301T	Constitution of India	2	-	-	2	10	10	30	50	23	1.5
9.	HSSM	25ES302T	Fundamentals of Entrepreneurship	2	-	-	2	10	10	30	50	23	1.5
10.	SEC	25AI341P	Career Development I	-	-	2	1	-	50	-	50	25	-
11.	MDM	25AI331M	MDM-I (Refer MDM basket)	2	-	2	2	10	10	30	50	23	1.5
<b>Total</b>				<b>15</b>	<b>0</b>	<b>12</b>	<b>20</b>	<b>90</b>	<b>240</b>	<b>370</b>	<b>700</b>		

Note:- Any one PCC to be conducted online through NPTEL. The course will be notified one month prior to commencement of semester.

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### Department of Artificial Intelligence

#### SEMESTER IV

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	25AI401T	Theory of Computation	3			3	20	20	60	100	45	3
2.	PCC	25AI402T	Design and Analysis of Algorithms	3			3	20	20	60	100	45	3
3.	PCC	25AI402P	Design and Analysis of Algorithms Lab			2	1		25	25	50	25	
4.	PCC	25AI403P	Java Programming Lab			2	1		25	25	50	25	
5.	PCC	25AI404P	Data Engineering & Management Lab			2	1		25	25	50	25	
6.	PCC	25AI405P	Web Programming for AI Lab			2	1		25	25	50	25	
7.	VEC	25ES401T	Environmental Science	2	-	-	2	10	10	30	50	23	1.5
8.	HSSM	25ES402T	Fundamentals of Economics and Management	2	-	-	2	10	10	30	50	23	1.5
9.	SEC	25AI441P	Career Development – II	-	-	2	1	-	50	-	50	25	-
10.	CEP	25AI407P	Mini Project*	-	-	4	2	-	50	-	50	25	-
11.	MDM	25AI431M	MDM-II (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
<b>Total</b>				<b>13</b>	<b>0</b>	<b>14</b>	<b>20</b>	<b>80</b>	<b>280</b>	<b>340</b>	<b>700</b>		

\* Field Project or Community engagement project in the major discipline.

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### Department of Artificial Intelligence

#### SEMESTER V

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	25AI501T	Machine Learning	3	-	-	3	20	20	60	100	45	3
2.	PCC	25AI501P	Machine Learning Lab	-	-	2	1	-	25	25	50	25	-
3.	PCC	25AI502T	Operating Systems	3			3	20	20	60	100	45	3
4.	PEC	25AI503T	Professional Elective-I	3	-	-	3	20	20	60	100	45	3
5.	PEC	25AI503P	Professional Elective -I Lab	-	-	2	1	-	25	25	50	25	-
8.	VSC	25AI504P	Technical Skill Development - I	-	-	4	2	-	50	-	50	25	-
9.	AEC	25AI541P	English for Engineers	-	-	4	2	-	50	-	50	25	-
6.	MDM	25AI531M	MDM – III (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
7.	OE	25AI561O	Open Elective – I (Refer OE basket)	2	-	-	2	10	10	30	50	23	1.5
<b>Total</b>				<b>14</b>	<b>0</b>	<b>12</b>	<b>20</b>	<b>90</b>	<b>240</b>	<b>320</b>	<b>650</b>		

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#### SEMESTER VI

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	25AI601T	Deep Learning	3	-	-	3	20	20	60	100	45	3
2.	PCC	25AI601P	Deep Learning Lab	-	-	2	1	-	25	25	50	25	-
3.	PEC	25AI602T	Professional Elective-II	2	-	-	2	10	10	30	50	23	1.5
4.	PEC	25AI602P	Professional Elective -II Lab	-	-	2	1	-	25	25	50	25	-
5.	PEC	25AI603T	Professional Elective III	3	-	-	3	20	20	60	100	45	3
8.	VSC	25AI604P	Technical Skill Development -II	-	-	4	2	-	50	-	50	25	-
9.	PROJ	25AI605P	Project - I	-	-	4	2	-	50	50	100	50	-
6.	MDM	25AI631M	MDM – IV (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
7.	OE	25AI661O	Open Elective – II (Refer OE basket)	3	-	-	3	20	20	60	100	45	3
<b>Total</b>				<b>14</b>	<b>0</b>	<b>12</b>	<b>20</b>	<b>90</b>	<b>240</b>	<b>370</b>	<b>700</b>		

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#### SEMESTER VII

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	25AI701T	Natural Language Processing & Chabot	3	-	-	3	20	20	60	100	45	3
2.	PCC	25AI701P	Natural Language Processing & Chatbot Lab	-	-	2	1		25	25	50	25	
3.	PCC	25AI702T/P	Machine Learning operations Lab			4	2		25	25	50	25	
4.	PEC	25AI703T	Professional Elective-IV	3	-	-	3	20	20	60	100	45	3
5.	PEC	25AI704T	Professional Elective-V	2	-	-	2	10	10	30	50	23	1.5
8.	PEC	25AI704P	Professional Elective- V Lab	-	-	2	1		25	25	50	25	
6.	PROJ	25AI705P	Project - II	-	-	4	2	-	50	50	100	25	-
7.	MDM	25AI731M	MDM – V (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
8.	OE	25AI761O	Open Elective – III (Refer OE basket)	3	-	-	3	20	20	60	100	45	3
<b>Total</b>				<b>14</b>		<b>8</b>	<b>20</b>	<b>90</b>	<b>215</b>	<b>395</b>	<b>700</b>		

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#### SEMESTER VIII

##### Option A

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No of Hours for ESE
				L	T	P		Continual Assessment	Mid-Sem Examination	End Sem Examination	Total		
1	RM	25ES801T	Research Methodology <sup>#</sup>	2	-	-	2	10	10	30	50	23	1.5
2	RM	25ES801P	Research Methodology <sup>#</sup> Lab	-	-	4	2	-	25	25	50	25	-
3	PEC	25AI801T	Professional Elective VI <sup>#</sup>	3	--	-	3	20	20	60	100	45	3
4	PEC	25AI801T	Professional Elective VI Lab <sup>#</sup>	-	-	2	1	-	25	25	50	25	-
5	OJT	25AI803P(i)	Industry/Research Internship*	-	-	24	12	-	300	100	400	200	-
<b>Total</b>				<b>5</b>	<b>0</b>	<b>30</b>	<b>20</b>	<b>30</b>	<b>380</b>	<b>240</b>	<b>650</b>		

##### Option B

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration No of Hours for ESE
				L	T	P		Continual Assessment	End Sem Examination	End Sem Examination	Total		
1	RM	25ES801T	Research Methodology <sup>#</sup>	2	-	-	2	10	10	30	50	23	1.5
2	RM	25ES801P	Research Methodology <sup>#</sup> Lab			4	2	-	25	25	50	25	-
3	PEC	25AI802T	Professional Elective -VI <sup>#</sup>	3			3	20	20	60	100	45	3
4	PEC	25AI802P	Professional Elective -VI Lab <sup>#</sup>		-	2	1	-	25	25	50	25	-
5	OJT	25AI804P(i)	Institutional Internship <sup>s</sup> & Project III	-	-	24	12	-	300	100	400	200	-
<b>Total</b>				<b>5</b>	<b>0</b>	<b>30</b>	<b>20</b>	<b>30</b>	<b>380</b>	<b>240</b>	<b>650</b>		

Option B is available to students only after recommendation of the concerned Head of the department. The project and internship should contribute towards career development plan of the students.

<sup>#</sup> Courses to be mapped with NPTEL/SWAYAM/MOOC offered course in that semester. Exam will be conducted by NPTEL/Institute

\* One semester internship in any industry carried.

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§ Two NPTEL courses of total six credits (as per choice of student) or Institutional Internship by IEDC, SVP CET.

#### Basket for Multi-Disciplinary Minor Courses (MDM)

##### A. Department of Artificial Intelligence

Semester	Course Category	Course Code	Name of Course	Credits
III	MDM-I	25AI331M	Responsible AI	2
IV	MDM-II	25AI431M	Data Centric AI	3
V	MDM-III	25AI531M	Explainable AI	3
VI	MDM-IV	25AI631M	AI in Engineering Systems	3
VII	MDM-V	25AI731M	Expert Systems for Artificial Intelligence	3

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#### Basket for Open Elective Courses (OE)

#### B. Department of Artificial Intelligence

Semester	Course Category	Course Code	Name of Course	Credits
V	OE-I	25AI561O	Introduction to Artificial Intelligence	2
VI	OE-II	25AI661O	Introduction to Machine Learning	3
VII	OE-III	25AI761O	Foundation of Deep Learning	3

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#### Basket for Program Elective Courses (PEC)

#### C. Department of Artificial Intelligence

Semester	Course Category	Course Code	Name of Course	Credits
V	PEC I	25AI503T	(i) Software Engineering & Project Management	3
V	PEC I	25AI503T	(ii) Essential Scrum: An Agile Process	
V	PEC I Lab	25AI503P	(i) Software Engineering & Project Management Lab	1
V	PEC I Lab	25AI503P	(ii) Essential Scrum: An Agile Process Lab	
VI	PEC II	25AI602T	(i) Cloud Computing	2
VI	PEC II	25AI602T	(ii) Big Data Analytics and Business Intelligence	
VI	PEC II Lab	25AI602P	(i) Cloud Computing Lab	1
VI	PEC II Lab	25AI602P	(ii) Big Data Analytics and Business Intelligence Lab	
VI	PEC III	25AI603T	(iii) Computer Networks	3
VI	PEC III	25AI603T	(iv) AI for Cyber security	
VII	PEC IV	25AI702T	(i) Internet of Things & Edge Computing	3
VII	PEC IV	25AI702T	(ii) Edge AI	
VII	PEC V	25AI703T	(i) Computer Vision	2
VII	PEC V	25AI703T	(ii) Pattern Recognition	
VII	PEC V Lab	25AI703P	(i) Computer vision Lab	1
VII	PEC V Lab	25AI703P	(ii) Pattern Recognition Lab	
VIII	PEC VI (NPTEL)	25AI801T	(i) Foundation of Generative AI & LLM	3
VIII	PEC VI (NPTEL)	25AI801T	(ii) Blockchain & its applications	
VIII	PEC VI (NPTEL) Lab	25AI801P	(i) Foundation of Generative AI & LLM Lab	1
VIII	PEC VI (NPTEL) Lab	25AI801P	(ii) Blockchain & its applications Lab	

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#### EXIT OPTIONS

**Award of UG Certificate in Major with 40 credits and an additional 8 credits (After First Year)**

EXIT COURSES			
S.N.	Course name	Mode of conduction	Credits
1.	Professional Orientation By Dr. Vandana Devi, NITTR, Chennai	NPTEL SWAYAM Online	2
2.	Web Technology	NPTEL Online	2
3.	Internship	Online/Offline	4

**Award of UG Diploma in Major with 80 credits and an additional 8 credits (After Second Year)**

EXIT COURSES			
S.N.	Course name	Mode of conduction	Credits
1.	Introduction to Machine Learning By Prof. Balaraman Ravindran   IIT Madras	NPTEL Online	4
2.	Internship	Online/Offline	4

**Award of UG Degree in Major with 120 credits and an additional 8 credits (After Third Year)**

EXIT COURSES			
S.N.	Course name	Mode of conduction	Credits
1.	Cloud Computing	Online	4
2.	Internship	Online/Offline	4

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