



**Artificial Intelligence and Data Science (AI&DS)** 

				III SEN	MESTER								
							eachin ours/we			Exami	nation		
SI. No.		e & Course Code	Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Duration in Hours	Marks	, Marks	Fotal Marks	Credits
						L	T	P	Dur	CIE	SEE	Tota	
1	BSC	21MAT31	Engineering Mathematic-III	Basic Science	Basic Science	2	2	0	03	50	50	100	3
2	IESC	21AD32	Data Structures and Applications	AI&DS	AI&DS	3	0	2	03	50	50	100	4
3	IESC	21AD33	Analog and Digital Electronics	AI&DS/ BM&RE	AI&DS/ BM&RE	3	0	2	03	50	50	100	4
4	ESC	21AD34	Computer Organization	AI&DS	AI&DS	2	2	0	03	50	50	100	3
5	ESC	21AD35	Software Engineering	AI&DS	AI&DS	2	2	0	03	50	50	100	3
6	IESC	21AD36	Discrete Mathematical Structure	AI&DS	AI&DS	2	2	0	03	50	50	100	3
7	CEE	21CIV37	Environmental Studies	CEE	CEE	1	0	0	NA	50	-	50	1
8	UHV	21UHV38	Universal Human Values and Professional Ethics	Basic Science	Basic Science	1	0	0	NA	50	-	50	1
			Total	GDE G	16	08	04	18	400	300	700	22	

Note: BSC: Basic Science Courses, ESC: Engineering Science Courses, CEE: Civil Environmental Engineering, UHV: Universal Human Values, BM&RE: Biomedical and Robotics Engineering. NCMC: Non-credit mandatory course, INT: Internship, IESC: Integrated Engineering Science Course.

#### Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

10	NC MC	21MATDIP31	Additional Mathematics-1	Basic Science	Basic Science	2	2	0	03	50	50	100	0
11	NC MC	21KANDIP32	Technical Kannada	Basic Science	Basic Science	0	2	0	-	50	-	50	0

(a) The mandatory non - credit courses Additional Mathematics I and II prescribed for III and IV semesters respectively, to the lateral entry Diploma holders admitted to III semester of BE programs, shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the University examination. In case, any student fails to register for the said course/ fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured F grade. In such a case, the student has to fulfil the requirements during subsequent semester/s to appear for SEE.

(b) These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree

#### **Credit Definition:**

1-hour lecture(**L**) per week per semester = **1** Credit

2-hour tutorial (**T**) per week per semester = **1** Credit

1 Credit

2-hour Practical/Drawing (**P**) per week per semester =

Four-credit courses are to be designed for 50 hours of Teaching-Learning process. Three credit courses are to be designed for 40 hours of Teaching-Learning process.

Two credit courses are to be designed for 25 hours of Teaching-Learning process. One credit course is to be designed for 15 hours of Teaching-Learning process.

AICTE Activity Points to be earned by students admitted to BE/B.Tech., 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 Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to UoM. 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, an 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.



Scheme of Teaching and Examination 2021-2022 (As per NEP-2020)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-2022)



## **Artificial Intelligence and Data Science (AI&DS)**

				IV SEN	MESTER								
							eachin; urs/we			Exami	nation		
Sl. No		e & Course Code	Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Duration in Hours	Marks	SEE Marks	Fotal Marks	Credits
						L	T	P	Dur	CIE	SEI	Tot	
1	BSC	21MAT41	Engineering Mathematics-IV	Basic Science	Basic Science	2	2	0	03	50	50	100	3
2	IESC	21AD42	Design and Analysis of Algorithms	AI&DS	AI&DS	3	0	2	03	50	50	100	4
3	IESC	21AD43	Operating Systems	AI&DS	AI&DS	2	2	2	03	50	50	100	4
4	ESC	21AD44	Data Communication	AI&DS	AI&DS	3	0	0	03	50	50	100	3
5	IESC	21AD45	Programming in C++	AI&DS	AI&DS	2	0	2	03	50	50	100	3
6	IESC	21AD46	Graph Algorithms	AI&DS	AI&DS	2	0	2	03	50	50	100	3
7	HSM C	HSM Constitution of India, Basic Basic						0	NA	50	-	50	1
8	AEC	Course-II Dept. Dept						0	NA	50	-	50	1
9	INT	-	Summer Internship-II		rried out du ons of IV a				-	-	-	-	-
			Total		16	04	08	18	400	300	700	22	

**Note:** BSC: Basic Science Courses, ESC: Engineering Science Courses, HSMC: Humanity, Social Science and Management Courses. NCMC: Non-credit mandatory course, AEC: Ability Enhancement Course, INT: Internship, IESC: Integrated Engineering Science Couse.

Summer Internship-I (21INT58): shall be carried out at industrial (State and Central Government /Non-government organizations (NGOs)/Micro, Small and Medium Enterprise (MSME)/Innovation centres/ Incubation centres. The internship can also be Rural internship. All the students admitted shall have to undergo a mandatory internship of 04 weeks during the intervening vacation of IV and V semesters. A University Viva-Voce examination (Presentation followed by Question & Answer session) shall be conducted during V semester and the prescribed credit shall be included in the V semester. The internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take up/complete the internship shall be declared fail and shall have to complete during subsequent University examination after satisfying the internship requirements. (The faculty coordinator or mentor has to monitor the students' internship progress and interact to guide them for the successful completion of the internship.)

Summer Internship-I: SEE shall be through seminar and viva-voce.

#### Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

11	NCM C	21MATDIP41	Additional Mathematics-II	Basic Science	Basic Science	02	02	-	03	50	50	100	0
12	NCM C	21ENGDIP42	Technical English	Basic Science	Basic Science	-	2	-	-	50	-	50	0

(a)The mandatory non – credit courses Additional Mathematics I and II prescribed for III and IV semesters respectively, to the lateral entry Diploma holders admitted to III semester of BE programs, shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the University examination. In case, any student fails to register for the said course/ fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured F grade. In such a case, the student has to fulfil the requirements during subsequent semester/s to appear for SEE.

(b) These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree

#### **Credit Definition:**

- 1-hour lecture(**L**) per week per semester = **1** Credit
- 2-hour tutorial (**T**) per week per semester = **1** Credit
- 2-hour Practical/Drawing (P) per week per semester = 1 Credit

**Four-credit** courses are to be designed for **50** hours of Teaching-Learning process. **Three credit** courses are to be designed for **40** hours of Teaching-Learning process.

Two credit courses are to be designed for 25 hours of Teaching-Learning process. One credit course is to be designed for 15 hours of Teaching-Learning process.

**AICTE Activity Points:** In case students fail to earn the prescribed activity Points, an 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.





Scheme of Teaching and Examination 2021-2022(As per NEP-2020)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021–2022)

**Artificial Intelligence and Data Science (AI&DS)** 

				V-SEN	MESTER								
							eachir ours/w			Exami	nation		
Sl. No.		& Course Code	Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Total Marks	Credits
	Management and					L	Т	P	Exami	CIE	SEE	Tota	
1	HSMC	21AD51	Management and Entrepreneurship	AI&DS	AI&DS	3	0	0	03	50	50	100	3
2	IPCC	21AD52	Programming in Java	AI&DS	AI&DS	2	0	2	03	50	50	100	3
3	IPCC	21AD53	Database Management System	AI&DS	AI&DS	3	0	2	03	50	50	100	4
4	PCC	21AD54	Automata Theory	AI&DS	AI&DS	3	0	0	03	50	50	100	3
5	IPCC	21AD55	Principles of Artificial Intelligence	AI&DS	AI&DS	3	0	2	03	50	50	100	4
6	PEC	21AD56X	Professional Elective -1	AI&DS	AI&DS	3	0	0	03	50	50	100	3
7	OEC	21AD57X	Open Elective - 1	AI&DS	AI&DS	3	0	0	03	50	50	100	3
8				vacation o	d during the of IV and V esters	0	0	2	NA	50	-	50	1
				20	00	08	21	400	350	750	24		

**Note:** PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, AI&DS: Artificial Intelligence and Data Science, HSMC: Humanity Social Science and Management Courses, PEC: Professional Elective Course, OEC: Open Elective Course and INT: Internship.

	Professional Elective-1		Open Elective-1
Course Code	Course Title	Course Code	Course Title
21AD561	Web Technology	21AD571	Introduction to Data Structure and Algorithm
21AD562	Linear Algebra	21AD572	Introduction to Database Management System
21AD563	Data Mining	21AD573	Programming in Java
		21AD574	Introduction to Artificial Intelligence
		21AD575	Python Programming

#### **Credit Definition:**

- 1-hour lecture(L) per week per semester = 1 Credit
- 2-hour tutorial (T) per week per semester = 1 Credit
- 2-hour Practical/Drawing (P) per week per semester = 1 Credit

**Four-credit** courses are to be designed for **50** hours of Teaching-Learning process. **Three credit** courses are to be designed for **40** hours of Teaching-Learning process. **Two credit** courses are to be designed for **25** hours of Teaching-Learning process. **One credit** course is to be designed for **15** hours of Teaching-Learning process.

AICTE Activity Points: In case students fail to earn the prescribed activity Points, an 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.



Scheme of Teaching and Examination 2021-2022(As per NEP-2020)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021–2022)



**Artificial Intelligence and Data Science (AI & DS)** 

				VI-SEN	MESTER								
							eachir urs/wo			Exam	ination		
Sl. No.			Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	Marks	Marks	Total Marks	Credits
						L	Т	P	Examin Hours	CIE	SEE	Tota	
1	IPCC	21AD61	Application Development using Python	AI&DS	AI&DS	3	0	2	03	50	50	100	4
2	IPCC	21AD62	Big Data Analytics	AI&DS	AI&DS	3	0	2	03	50	50	100	4
3	IPCC	21AD63	Principles of Data Science	AI&DS	AI&DS	3	0	2	03	50	50	100	4
4	PCC	21AD64	Cloud Computing	AI&DS	AI&DS	3	0	0	03	50	50	100	3
5	PEC	21AD65X	Professional Elective - 2	AI&DS	AI&DS	3	0	0	03	50	50	100	3
6	OEC	21AD66X	Open Elective – 2	AI&DS	AI&DS	3	0	0	03	50	50	100	3
7 MP 21ADP67 Mini Project AI&DS AI&DS						0	0	2	NA	50	1	50	1
	Total							08	18	350	300	650	22

**Note:** PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, AI&DS: Artificial Intelligence and Data Science, MP: Mini Project, PEC: Professional Elective Course, OEC: Open Elective Course and INT: Internship.

	Professional Elective - 3		Open Elective - 2
Course Code	Course Title	Course Code	Course Title
21AD651	Research Methodology and Intellectual Property Rights	21AD661	Internet of Things
21AD652	Machine Learning	21AD662	Introduction to Machine Learning
21AD653	Image Processing	21AD663	Introduction to Cyber Security
21AD654	Social Network Analysis	21AD664	Introduction to Web Technology
		21AD665	Animation and Visualization

Students can select any one of the open electives offered by any department.

Selection of an open elective is not allowed provided,

- The candidate has studied the same course during the previous semesters of the programme.
- The syllabus content of open elective is similar to that of Departmental core courses or professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the programme.

Registration to electives shall be documented under the guidance of Programme Coordinator/ Adviser/Mentor.

**Mini-project work:** Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary Mini project can be assigned to an individual student or to a group having not more than 4 students.

#### **CIE procedure for Mini project:**

- (i) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide. The CIE marks awarded for the Mini-project work, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.
- (ii) Interdisciplinary: Continuous Internal Evaluation shall be group wise at the college level with the participation of all the guides of the college. The CIE marks awarded for the Mini-project, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**AICTE Activity Points:** In case students fail to earn the prescribed activity Points, an 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.





Scheme of Teaching and Examination 2021-2022(As per NEP-2020) Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (Effective from the academic year 2021–2022)

**Artificial Intelligence and Data Science (AI&DS)** 

				VII-SE	MESTER								
					Paper		Teach	0		Exam	ination		S
Sl. No.	004250	& Course Code	Course Title	Teaching Dept.	Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Fotal Marks	Credits
					L	T	P	図		92	I		
1	IPCC	21AD71	Data Modeling and Visualization	AI&DS	AI&DS	2	2	2	03	50	50	100	4
2	PCC	21AD72	Algorithm for Clustering Data	AI&DS	AI&DS	2	2	0	03	50	50	100	3
3	PEC	21AD73X	Professional Elective -3	AI&DS	AI&DS	2	2	0	03	50	50	100	3
4	PEC	21AD73X	Professional Elective -4	AI&DS	AI&DS	2	2	0	03	50	50	100	3
5	Project	21ADP74	Project work Phase – I	AI&DS	AI&DS	0	0	4	03	100		100	2
6 AEC 21AEC75X Ability Enhancement Course-III Any Dept. Any Dept.						0	0	2		50		50	1
7	INT	21INT83	Summer Internship-II		Complet	ed duri	ng the	e vacation	of VI ar	nd VII s	emester	·s	
	Total							08 08 08 15				550	16

Note: PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, AI&DS: Artificial Intelligence and Data Science, PEC: Professional Elective Course, AEC: Ability Enhancement Course, PROJECT: Project work phase-1 and INT: Internship.

	Professional Elective-3 a	and Professional	Elective-4	Abili	ity Enhancement Course
Course Code	Course Title	Course Code	Course Title	Course Code	Course Title
21AD731	Neural Networks and Deep Learning	21AD735	Multimedia Data Analysis	21AEC751	Project Management with Git
21AD732	Natural Language Processing	21AD736	Data Security and Privacy	21AEC752	Technical Writing using LaTeX
21AD733	High Performance Computing	21AD737	Block Chain Technology	21AEC753	C# and .NET Framework
21AD734	Statistical Analysis	21AD738	Business Data Intelligence	21AEC754	Data Clustering Applications

## Credit Definition:

1-hour lecture(L) per week per semester = 1 Credit

2-hour tutorial (T) per week per semester = 1 Credit

2-hour Practical/Drawing (P) per week per semester = 1

Four-credit courses are to be designed for 50 hours of Teaching-Learning process. Three credit courses are to be designed for 40 hours of Teaching-Learning process. Two credit courses are to be designed for 25 hours of Teaching-Learning process. One credit course is to be designed for 15 hours of Teaching-Learning process

Professional Elective Courses (PEC): A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of engineering. Students can select any one of the professional electives offered by any department. Selection of a professional elective is not allowed provided,

- The candidate has studied the same course during the previous semesters of the programme.
- The syllabus content of open elective is similar to that of Departmental core courses, Open Electives or Professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the programme.
- Registration to electives shall be documented under the guidance of Programme Coordinator/ Adviser/Mentor.

Project work: Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary Mini project can be assigned to an individual student or to a group having not more than 4 students. CIE procedure for Project:

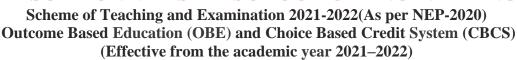
- (i) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide. The CIE marks awarded for the Mini-project work, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.
- (ii) Interdisciplinary: Continuous Internal Evaluation shall be group wise at the college level with the participation of all the guides of the college. The CIE marks awarded for the Mini-project, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

AICTE Activity Points: AICTE Activity Points to be earned by students admitted to BE/B.Tech., 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 Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to UoM. 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, an 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.







**Artificial Intelligence and Data Science (AI&DS)** 

				VIII	I-SEMEST	ER							
						Teac	hing Ho	urs/week	]	Examin	ation		
Sl. No.			Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Total Marks	Credits
						L	T	P	Я	)	91	L	
1	Project	21ADP81	Project work Phase - II	AI&DS	AI&DS	0	0	12	03	100	100	200	8
2	Seminar	21ADS82	Technical Seminar	AI&DS	AI&DS	Two interaction hours/week between student and faculty.		03	100		100	3	
3	INT	21INT83	Summer Internship-II		Completed during the vacation of VI hours/week between student and faculty.				100		100	3	
	Total					00	00	16	06	300	100	400	14

Note: AI&DS: Artificial Intelligence and Data Science, PROJECT: Project work phase-II and INT: Internship

AICTE Activity Points: In case students fail to earn the prescribed activity Points, an 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.

#### Credit Definition:

1-hour lecture(L) per week per semester = 1 Credit 2-hour tutorial (T) per week per semester = 1 Credit

2-hour Practical/Drawing (P) per week per semester = 1 Credit

Four-credit courses are to be designed for 50 hours of Teaching-Learning process.

Three credit courses are to be designed for 40 hours of Teaching-Learning process. Two credit courses are to be designed for 25 hours of Teaching-Learning process. One credit course is to be designed for 15 hours of Teaching-Learning process

**TECHNICAL SEMINAR**: The objective of the seminar is to inculcate self-learning, present the seminar topic confidently, enhance communication skill, involve in group discussion for exchange of ideas. Each student, under the guidance of a Faculty, shall choose, preferably, a recent topic of his/her interest relevant to the programme of Specialization.

- Carry out literature survey, systematically organize the content.
- Prepare the report with own sentences, avoiding a cut and paste act.
- Type the matter to acquaint with the use of Micro-soft equation and drawing tools or any such facilities.
- Present the seminar topic orally and/or through PowerPoint slides.
- Answer the queries and involve in debate/discussion.
- Submit a typed report with a list of references.

The participants shall take part in the discussion to foster a friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident

#### **Evaluation Procedure:**

The CIE marks for the seminar shall be awarded (based on the relevance of the topic, presentation skill, participation in the question and answer session, and quality of report) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three teachers from the department with the seniormost acting as the Chairman.

Marks distribution for CIE of the course:

Seminar Report:50 marks Presentation skill:25 marks Question and Answer: 25 marks.

### **CIE** procedure for Project Work:

- Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two seniors faculty members of the Department, one of whom shall be the Guide. The CIE marks awarded for the project work, shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.
- Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work, shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.
- SEE procedure for Project Work: SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25