

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 Machine Learning (AI&ML)

				III SEM	ESTER								
							eachi urs/w			Exam	ination		
Sl. No.		& Course Code	Course Title Teaching Dept.		Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Duration in Hours	. Marks	SEE Marks	Total Marks	Credits
						L	T	P	Dm	CIE	SEI	Tot	
1	BSC	21MAT31	Engineering Mathematic-III	Basic Science	Basic Science	2	2	0	0 03 50 50 100				3
2	IPCC	21AI32	Data Structures and Applications	AI&ML	AI&ML	3	0	2	03	50	50	100	4
3	IPCC	21AI33	Analog and Digital Electronics	AI&ML/ BM&RE	AI&ML/ BM&RE	3	0	2	03	50	50	100	4
4	PCC	21AI34	Computer Organization	AI&ML	AI&ML	2	2	0	03	50	50	100	3
5	PCC	21AI35	Software Engineering	AI&ML	AI&ML	2	2	0	03	50	50	100	3
6	PCC	21AI36	Discrete Mathematical Structures	AI&ML	AI&ML	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	AI&ML	AI&ML	1	0	0	NA	50	-	50	1	
			Total		16	08	04	18	400	300	700	22	

Note: BSC: Basic Science Courses, PCC: Professional Core Courses, IPCC: Professional Lab Courses, CEE: Civil Environmental Engineering, BM&RE: Biomedical and Robotics Engineering, UHV: Universal Human Values, 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	NCMC	21MATDIP3	Additional	Basic	Basic	2	2	0	03	50	50	100	0
	10	NCMC	1	Mathematics-1	Science	Science	2	2	O	03	30	30	100	U
Ī	11	NCMC	21KANDIP3	Technical	Basic	Basic	0	2	0	-	50	_	50	0
			2	Kannada	Science	Science								

(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:

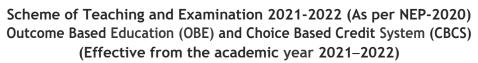
1-hour lecture(L) per week per semester = 1 Credit 2-hour tutorial (T) per week per semester = 1 Credit

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 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 Machine Learning (AI&ML)

				IV SEM	ESTER								
							eachi urs/w			Exam	ination		
Sl. No.		& Course Code	Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Duration in Hours	CIE 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	IPCC	21AI42	Design and Analysis of Algorithms	AI&ML	AI&ML	3	0	2	03	50	50	100	4
3	IPCC	21AI43	Operating Systems	AI&ML	AI&ML	2	2	2	03	50	50	100	4
4	PCC	21AI44	Data Communication	AI&ML	AI&ML	3	0	0	03	50	50	100	3
5	PCC	21AI45	Programming in C++	AI&ML	AI&ML	2	0	2	03	50	50	100	3
6	PCC	21AI46	Graph Algorithms	AI&ML	AI&ML	2	0	2	03	50	50	100	3
7	CEE	21CPH47	Constitution of India, Professional Ethics and Cyber Law	n of India, al Basic Basic				0	NA	50	-	50	1
8	UHV	21AEC48	AI&ML	1	0	0	NA	50	-	50	1		
9	BSC	21INT49	Summer Internship-II		ried out duri				-	-	-	-	-
			16	04	08	18	400	300	700	22			

Note: BSC: Basic Science Courses, PCC: Professional Core Courses, IPCC: Professional Lab Courses, HSMC: Humanity, Social Science and Management Courses. NCMC: Non-credit mandatory course, AEC: Ability Enhancement Course, INT: Internship, IESC: Integrated Engineering Science Course.

Summer Internship-I (21INT59): 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	NCMC	21MATDIP4 1	Additional Mathematics-II	Basic Science	Basic Science	02	02	-	03	50	50	100	0
12	NCMC	21ENGDIP4	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:

 $1\text{-hour lecture}(L) \ per \ week \ per \ semester = 1 \ Credit$

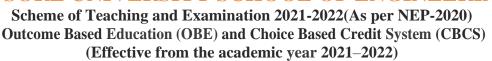
2-hour tutorial (T) per week per semester = 1 Credit

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.







Artificial Intelligence and Machine Learning (AI&ML)

				V-SE	MESTER								
							eachir urs/w			Exami	ination		
Sl. No.		& Course ode	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	Examin Hours	CIE	SEE	Tota	
1	HSMC	21AI51	Management and Entrepreneurship	AI&ML	AI&ML	3	0	0	03	50	50	100	3
2	IPCC	21AI52	Programming in Java	AI&ML	AI&ML	2	0	2	03	50	50	100	3
3	IPCC	21AI53	Database Management System	AI&ML	AI&ML	3	0	2	03	50	50	100	4
4	PCC	21AI54	Automata Theory	AI&ML	AI&ML	3	0	0	03	50	50	100	3
5	PCC	21AI55	Principles of Artificial Intelligence	AI&ML	AI&ML	3	0	2	03	50	50	100	4
6	PEC	21AI56X	Professional Elective -1	AI&ML	AI&ML	3	0	0	03	50	50	100	3
7	OEC	21AI57X	Open Elective - 1	AI&ML	AI&ML AI&ML		0	0	03	50	50	100	3
8	INT	I during the of IV and V esters	0	0	2	NA	50	-	50	1			
			Total			20	00	08	21	400	350	750	24

Note: PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, AI&ML: Artificial Intelligence and Machine Learning, 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
21AI561	Web Technology	21AI571	Introduction to Data Structure and Algorithm
21AI562	Liner Algebra	21AI572	Introduction to Database Management System
21AI563	Data Mining	21AI573	Programming in Java
		21AI574	Introduction to Artificial Intelligence
		21AI575	Python Programming

Credit Definition:

- 1-hour lecture(\mathbf{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.

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.



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Artificial Intelligence and Machine Learning (AI&ML)

	VI-SEMESTER Teaching												
							eachin urs/we	_		Exam	ination		
Sl. No.	Course & Course Code		Course Title	Teaching Dept.	Paper Setting Board	Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	Marks	Marks	Total Marks	Credits
	IPCC 21 A I 61					L	T	P	Exami Hours	CIE	SEE	Tota	
1	IPCC	21AI61	Application Development using Python	AI&ML	AI&ML	3	0	2	03	50	50	100	4
2	IPCC	21AI62	Statistical Analysis	AI&ML	AI&ML	3	0	2	03	50	50	100	4
3	IPCC	21AI63	Machine Learning	AI&ML	AI&ML	3	0	2	03	50	50	100	4
4	PCC	21AI64	Cloud Computing	AI&ML	AI&ML	3	0	0	03	50	50	100	3
5	PEC	21AI65X	Professional Elective -2	AI&ML	AI&ML	3	0	0	03	50	50	100	3
6	OEC	21AI66X	Open Elective – 2	AI&ML	AI&ML	3	0	0	03	50	50	100	3
7	MP	21AIP67	Mini Project	AI&ML	0	0	2	NA	50	1	50	1	
		·	Total		· · · · · · · · · · · · · · · · · · ·	18	0	08	18	350	300	650	22

Note: PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, AI&ML: Artificial Intelligence and Machine Learning, MP: Mini Project, PEC: Professional Elective Course, OEC: Open Elective Course and INT: Internship.

	Professional elective - 2		Open Elective - 2
Course Code	Course Title	Course Code	Course Title
21AI641	Research Methodology and Intellectual Property Rights	21AI651	Introduction to Internet of Things
21AI642	Principles of Data Science	21AI652	Introduction to Machine Learning
21AI643	Social Network Analysis	21AI653	Introduction to Cyber Security
21AI644	Big Data Analytics	21AI654	Introduction to Web Technology
	·	21AI655	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.



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			V	II-SEME	STER								
							eachin	0		Exa	minatio	on	
Sl. No.	No. Course & Course Code		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	A)	S	T	
1	IPCC	21AI71	Deep Learning	AI&ML	AI&ML	2	2	2	03	50	50	100	4
2	PCC	21AI72	Natural Language Processing	AI&ML	AI&ML	2	2	0	03	50	50	100	3
3	PEC	21AI73X	Professional Elective - 3	AI&ML	AI&ML	2	2	0	03	50	50	100	3
4	PEC	21AI73X	Professional Elective - 4	AI&ML	AI&ML	2	2	0	03	50	50	100	3
5	PROJECT	21AIP74	Project work Phase – I	AI&ML	AI&ML	0	0	4	03	100		100	2
6	AEC	21AEC75X	Ability Enhancement Course-III	AI&ML	AI&ML AI&ML 0 (50		50	1
7	INT	21INT83	Summer Internship-II		Compl	leted du	_	ie vacat nesters	ion of V	/I and	VII		
			Total		08	08	08	15	350	200	550	16	

Note: PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, AI&ML: Artificial Intelligence and Machine Learning, PEC: Professional Elective Course, AEC: Ability Enhancement Course, PROJECT: Project work phase-I and INT: Internship.

	Professional Elective - 3 and	Professiona	al Elective - 4	Abili	ity Enhancement Course
Course Code	Course Title	Course Code	Course Title	Course Code	Course Title
21AI731	Algorithms for Cluster Data	21AI735	Generative Artificial Intelligence	21AEC751	Digital Image Processing Applications
21AI732	Blockchain Technology	21AI736	Information Retrieval	21AEC752	Generative AI Applications
21AI733	Digital Image Processing	21AI737	Predictive Analytics	21AEC753	Project Management Using Git
21AI734	Fuzzy Sets Theory	21AI738	Soft Computing	21AEC754	Technical Writing with LATEX

Credit Definition:

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

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.*

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.



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				VIII-SI	EMESTER	2							
						Teachin	ng Hou	rs/week		Exami	nation		
Sl. No.			Course Title	Teaching Dept.	Paper Setting Board	Theory	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Total Marks	Credits
						L	T	P	E)	S	L	
1	PROJECT	21AIP81	Project work Phase - II	AI&ML	AI&ML	0 0 12		03	100	100	200	8	
2	Seminar	21AIS82	Technical Seminar	AI&ML	AI&ML	Two contact hour /week for interaction between the faculty and students.		tween	03	100		100	3
3	INT	21INT83	Summer Internship-II	Completed during the vacation of VI and VII semesters		Two cont for intera the facult	action be	tween		100		100	3
	Total						0 0 16 06 300 100 400						14

Note: AI&ML: Artificial Intelligence and Machine Learning, PROJECT: Project work phase-II and INT: Internship

Credit Definition:

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- 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

Technical Seminar: The objective of the seminar is to inculcate self-learning, present the seminar topic confidently, enhance communication skills, and involve participants in group discussions for the exchange of ideas. Each student, under the guidance of a faculty, shall choose, preferably, a recent topic of his or her interest relevant to the program of specialization.

- Carry out a literature survey and systematically organize the content.
- Prepare the report with your own sentences, avoiding a cut-and-paste act.
- Type the matter to become familiar with the use of Microsoft Excel, drawing tools, or any such facilities.
- Present the seminar topic orally and/or through PowerPoint slides.
- Answer the queries and involve yourself in debate or 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.

 $\label{eq:marks} \textbf{Marks distribution for CIE of the course:}$

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

No SEE component for Technical Seminar.

CIE procedure for Project Work:

- 1) **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.
- 2) **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.
- 3) **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

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.
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