



B.E. IN CSE (DATA SCIENCE)

SCHEME OF TEACHING AND EVALUATION 2022
OUTCOME BASED EDUCATION (OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(2022 SCHEME: EFFECTIVE FROM THE ACADEMIC YEAR 2023 - 24)

III SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD)	Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination				Credits
						Theory Lecture	Tutorial	Practical / Drawing	Self -Study	Duration in hours	CIA Marks	SEE Marks	Total Marks	
						L	T	P	S					
1	BSC	MA322T1C	Computational Discrete Mathematics	BSC	BSC	03	00	00	00	3	50	50	100	3
2	IPCC	CS322I2C	Logic Design and Embedded Systems	CSE Allied	CSE	03	00	02	00	3	50	50	100	4
3	IPCC	CS322I3C	Object Oriented Programming Concepts	CSE Allied	CSE	03	00	02	00	3	50	50	100	4
4	PCC	CS322T4C	Data Structures and Applications	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
5	PCCL	CS322L5C	Data Structures Laboratory with C	CSE Allied	CSE	00	00	02	00	3	50	50	100	1
6	ESC/ETC/PLC	CS322T6Cx	Engineering Science Course/ Emerging Technology Course/Programming Language Course	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
7	UHV	HU32287X	UHV-1: Social Connect and Responsibilities	BSC	BSC	01	00	00	00	1	50	50	100	1
8	AEC / SEC	CS32298Cx	Ability Enhancement Course III / Skill Enhancement Course III	CSE Allied	CSE	00	00	02	00	2	50	50	100	1
9	MC		National Service Scheme (NSS)	NSS / PED / Yoga		00	00	02	00	Registrations to any one of the courses be completed (as per the choice of the student) and activities to be carried out.				0
			Physical Education (PE) (Sports and Athletics)											
			Yoga											
											400	400	800	20

ESC/ETC/PLC

CS322T6CA	Programming with Python	CS322T6CC	Unix Shell Programming
CS322T6CB	Mobile Application Development	CS322T6CD	Ethical Hacking

ABILITY ENHANCEMENT COURSE III / SKILL ENHANCEMENT COURSE III

CS32298CA	Data Analytics Using Excel	CS32298CC	MERN
CS32298CB	UI/UX Design	CS32298CD	Competitive Programming Using C++

COURSE PRESCRIBED TO LATERAL ENTRY DIPLOMA HOLDERS ADMITTED TO III SEMESTER B.E. PROGRAMS

1		Additional Mathematics I	BSC	BSC	02	00	00	01	3	50	50	100	0
---	--	--------------------------	-----	-----	----	----	----	----	---	----	----	-----	---

Note: **BSC:** Basic Science Course, **IPCC:** Integrated Professional Core Course, **PCC:** Professional Core Course, **PCCL:** Professional Core Course Laboratory, **AEC:** Ability Enhancement Courses. **UHV:** Universal Human Value Course, **SEC:** Skill Enhancement Course, **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course, **MC:** Mandatory Course
L – Lecture, **T** – Tutorial, **P-** Practical/ Drawing, **S** – Self -Study Component, **CIA:** Continuous Internal Assessment, **SEE:** Semester End Examination, **TD-** Teaching Department, **PSB:** Paper Setting Board.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L: T: P) can be considered as (3: 0: 2) or (2: 2: 2). The theory part of the IPCC shall be evaluated both by CIA and SEE. The practical part shall be evaluated by only CIA (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

National Service Scheme (NSS)/ Physical Education (PE)/ Yoga: All the students have to register for any one of the courses namely NSS/ PE/ Yoga with the concerned coordinator of the course during the first week of the III semester. Activities shall be carried out between the III semester and VI semester (for Four Semesters). The events shall be appropriately scheduled and the same shall be reflected in the Institute Academic and Activity Calendar. The course will be evaluated only for the CIA marks and will not have SEE component. The students who successfully complete the registered course will be awarded with “PP” grade and the students not completing the same will be awarded with “NP” grade. The marks and the grade obtained by the student will be included in the SIXTH semester grade card. The course will not be considered for the SGPA and CGPA calculations and Vertical Progression, however, completion of the course is mandatory for the award of the Degree.

Non–Credit Mandatory Courses (NCMC):

(A) Additional Mathematics I:

- 1) This course is prescribed in the III semester to the to the lateral entry Diploma holders admitted to the second year of the B.E., programs. They shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the Continuous Internal Assessment (CIA). These courses are slated for both CIA and SEE.
- 2) Additional Mathematics I shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.
- 3) Successful completion of the courses Additional Mathematics I shall be indicated with Pass (PP) grade in the grade card. Non-completion of the courses will lead to the award of Not Pass (NP) Grade.
- 4) In case, any student fails to register for the said course/fails to secure the minimum 40% of the prescribed CIA marks and 40% of the prescribed SEE marks, shall be deemed to have secured an NP grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s.

(B) National Service Scheme (NSS)/Physical Education (Sport and Athletics) (PED)/ Yoga:

- 1) Securing 40% or more in CIA, 40% or more marks in SEE and 40% or more in the sum total of CIA + SEE leads to successful completion of the registered course.
- 2) In case, students fail to secure 40 % marks in SEE, they have to appear for SEE during the subsequent examinations and obtain the minimum requirement.
- 3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum requirements as mentioned in (B).1, they shall be awarded with NP Grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s.
- 4) Successful completion of the course shall be indicated with a PP Grade in the grade card.
- 5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

BoS SPECIFIED NPTEL COURSES

(APPLICABLE ONLY TO THE STUDENTS WHO FAIL IN A COURSE MORE THAN FOUR TIMES)

Course Code	Course Name	Alternative NPTEL Courses*
CS322T4C	Data Structures and Applications	Data Structures (12 Weeks)

***Subjected to change depending on the courses offered by the NPTEL.**

Note:

- The student has to provide the evidences for registering to the course, assignment submission, attending the examination and the certificate provided by NPTEL indicating the clearance of the Course by the candidate.
- Only on submitting the valid documents, the student will be awarded with the credits mentioned against the course(s)



B.E. IN CSE (DATA SCIENCE)

SCHEME OF TEACHING AND EVALUATION 2022
OUTCOME BASED EDUCATION (OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(2022 SCHEME: EFFECTIVE FROM THE ACADEMIC YEAR 2023 - 24)

IV SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD)	Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination				Credits
						Theory Lecture	Tutorial	Practical / Drawing	Self -Study	Duration in hours	CIA Marks	SEE Marks	Total Marks	
1	IPCC	AM422I1A	Principles of Artificial Intelligence	AIML/ DS	CSE	03	00	02	00	3	50	50	100	4
2	IPCC	CS422I2C	Operating Systems	CSE Allied	CSE	03	00	02	00	3	50	50	100	4
3	PCC	CS422T3C	Computer Organization and Architecture	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
4	PCC	CS422T4C	Design and Analysis of Algorithms	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
5	PCCL	CS422L5C	Design and Analysis of Algorithms Laboratory	CSE Allied	CSE	00	00	02	00	3	50	50	100	1
6	ESC/ETC/PLC	MA422T6Dx/ MA422T6Cx	Mathematics Course specific to the program	BSC	BSC	03	00	00	00	3	50	50	100	3
7	AEC / SEC	CS42297Cx/ IS42297Ix	Ability Enhancement Course IV / Skill Enhancement Course IV	CSE Allied	CSE	00	00	02	00	2	50	50	100	1
8	BSC	HI422T8X	Biology for Engineers	BSC	BSC	02	00	00	00	2	50	50	100	2
9	UHV	HU42289X	UHV-2: Understanding Harmony and Ethical Human Conduct	BSC	BSC	01	00	00	00	1	50	50	100	1
10	MC		National Service Scheme (NSS)	NSS / PED / Yoga		00	00	02	00	Activities to be carried out by the student in the registered course				0
			Physical Education (PE) (Sports and Athletics)											
			Yoga											
											450	450	900	22

ESC/ETC/PLC

MA422T6DA	Mathematics for Data Science	MA422T6CC	Optimization Techniques
MA422T6CB	Regression Statistical Computing	MA422T6CD	Metric Spaces

ABILITY ENHANCEMENT COURSE IV / SKILL ENHANCEMENT COURSE IV

CS42297CA	GitHub: AI-Powered Developer Platform	CS42297CC	Data Visualization Using R
IS42297IB	Node and React JS	CS42297CD	Competitive Programming Using GO

COURSE PRESCRIBED TO LATERAL ENTRY DIPLOMA HOLDERS ADMITTED TO III SEMESTER B.E. PROGRAMS

1		Additional Mathematics II	BSC	BSC	02	00	00	01	3	50	50	100	0
---	--	---------------------------	-----	-----	----	----	----	----	---	----	----	-----	---

Note: **BSC:** Basic Science Course, **IPCC:** Integrated Professional Core Course, **PCC:** Professional Core Course, **PCCL:** Professional Core Course Laboratory, **AEC:** Ability Enhancement Courses. **UHV:** Universal Human Value Course, **SEC:** Skill Enhancement Course, **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course, **MC:** Mandatory Course
L – Lecture, **T** – Tutorial, **P-** Practical/ Drawing, **S** – Self -Study Component, **CIA:** Continuous Internal Assessment, **SEE:** Semester End Examination, **TD-** Teaching Department, **PSB:** Paper Setting Board.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L: T: P) can be considered as (3: 0: 2) or (2: 2: 2). The theory part of the IPCC shall be evaluated both by CIA and SEE. The practical part shall be evaluated by only CIA (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

National Service Scheme (NSS)/ Physical Education (PE)/ Yoga: All the students have to register for any one of the courses namely NSS/ PE/ Yoga with the concerned coordinator of the course during the first week of the III semester. Activities shall be carried out between the III semester and VI semester (for Four Semesters). The events shall be appropriately scheduled and the same shall be reflected in the Institute Academic and Activity Calendar. The course will be evaluated only for the CIA marks and will not have SEE component. The students who successfully complete the registered course will be awarded with “PP” grade and the students not completing the same will be awarded with “NP” grade. The marks and the grade obtained by the student will be included in the SIXTH semester grade card. The course will not be considered for the SGPA and CGPA calculations and Vertical Progression, however, completion of the course is mandatory for the award of the Degree.

Non–Credit Mandatory Courses (NCMC):

(A) Additional Mathematics I:

- 1) This course is prescribed in the III semester to the to the lateral entry Diploma holders admitted to the second year of the B.E., programs. They shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the Continuous Internal Assessment (CIA). These courses are slated for both CIA and SEE.
- 2) Additional Mathematics I shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.
- 3) Successful completion of the courses Additional Mathematics I shall be indicated with Pass (PP) grade in the grade card. Non-completion of the courses will lead to the award of Not Pass (NP) Grade.
- 4) In case, any student fails to register for the said course/fails to secure the minimum 40% of the prescribed CIA marks and 40% of the prescribed SEE marks, shall be deemed to have secured an NP grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s.

National Service Scheme (NSS)/Physical Education (Sport and Athletics) (PED)/ Yoga:

- 1) Securing 40% or more in CIA, 40% or more marks in SEE and 40% or more in the sum total of CIA + SEE leads to successful completion of the registered course.
- 2) In case, students fail to secure 40 % marks in SEE, they have to appear for SEE during the subsequent examinations and obtain the minimum requirement.
- 3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum requirements as mentioned in (B).1, they shall be awarded with NP Grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s.
- 4) Successful completion of the course shall be indicated with a PP Grade in the grade card.
- 5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

BoS SPECIFIED NPTEL COURSES**(APPLICABLE ONLY TO THE STUDENTS WHO FAIL IN A COURSE MORE THAN FOUR TIMES)**

Course Code	Course Name	Alternative NPTEL Courses*
CS422T4C	Design & Analysis of Algorithms	Introduction to Algorithms and Analysis (12 Weeks)

Subjected to change depending on the courses offered by the NPTEL.*Note:**

- The student has to provide the evidences for registering to the course, assignment submission, attending the examination and the certificate provided by NPTEL indicating the clearance of the Course by the candidate.
- Only on submitting the valid documents, the student will be awarded with the credits mentioned against the course(s)



B.E. IN CSE (DATA SCIENCE)

SCHEME OF TEACHING AND EVALUATION 2022
OUTCOME BASED EDUCATION (OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(2022 SCHEME: EFFECTIVE FROM THE ACADEMIC YEAR 2024 - 25)

V SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD)	Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination				Credits
						Theory Lecture	Tutorial	Practical / Drawing	Self -Study	Duration in hours	CIA Marks	SEE Marks	Total Marks	
						T	T	P	S					
1	IPCC	IS522I1I	Data Science and Applications	ISE/DS	CSE	03	00	02	00	3	50	50	100	4
2	IPCC	CS522I2C	Computer Communications and Networks	CSE Allied	CSE	03	00	02	00	3	50	50	100	4
3	PCC	CS522T3C	Automata Theory and Computability	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
4	PCC	CS522T4C	Database Management Systems	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
5	PCCL	CS522L5C	Database Management Systems Laboratory	CSE Allied	CSE	00	00	02	00	3	50	50	100	1
6	PEC	CS52216Cx/I S52216Ix	Professional Elective I	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
7	PROJ	DS522P7D	Mini-Project Work	DS	CSE	00	00	04	00	3	50	---	50	2
8	AEC	BS52298X	Research Methodology and IPR	BSC	CSE	01	00	00	00	1	50	50	100	1
9	MC	BS52299X	Environmental Studies	BSC	BSC	01	00	00	00	1	50	50	100	1
10	MC		National Service Scheme (NSS)	NSS / PED / Yoga		00	00	02	00	Activities to be carried out by the student in the registered course				0
			Physical Education (PE) (Sports and Athletics)											
			Yoga											
											450	400	850	22

PROFESSIONAL ELECTIVE COURSES

IS52216IA	Information Storage Management	CS52216CC	Social Network Analysis
IS52216IB	Industrial IoT and Analytics	IS52216ID	Drone Technology and Applications

Note: **HSMC:** Humanities Science & Management Course, **IPCC:** Integrated Professional Core Course, **PCC:** Professional Core Course, **PCCL:** Professional Core Course Laboratory, **AEC:** Ability Enhancement Courses, **PEC:** Professional Elective Course, **MC:** Mandatory Course, **PROJ:** Project Work
L – Lecture, **T** – Tutorial, **P-** Practical/ Drawing, **S** – Self -Study Component, **CIA:** Continuous Internal Assessment, **SEE:** Semester End Examination, **TD-** Teaching Department, **PSB:** Paper Setting Board.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L: T: P) can be considered as (3: 0: 2) or (2: 2: 2). The theory part of the IPCC shall be evaluated both by CIA and SEE. The practical part shall be evaluated by only CIA (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

National Service Scheme (NSS)/ Physical Education (PE)/ Yoga: All the students have to register for any one of the courses namely NSS/ PE/ Yoga with the concerned coordinator of the course during the first week of the III semester. Activities shall be carried out between the III semester and VI semester (for Four Semesters). The events shall be appropriately scheduled and the same shall be reflected in the Institute Academic and Activity Calendar. The course will be evaluated only for the CIA marks and will not have SEE component. The students who successfully complete the registered course will be awarded with “PP” grade and the students not completing the same will be awarded with “NP” grade. The marks and the grade obtained by the student will be included in the SIXTH semester grade card. The course will not be considered for the SGPA and CGPA calculations and Vertical Progression, however, completion of the course is mandatory for the award of the Degree.

Non–Credit Mandatory Courses (NCMC):

National Service Scheme (NSS)/Physical Education (Sport and Athletics) (PED)/ Yoga:

- 1) Securing 40% or more in CIA, 40% or more marks in SEE and 40% or more in the sum total of CIA + SEE leads to successful completion of the registered course.
- 2) In case, students fail to secure 40 % marks in SEE, they have to appear for SEE during the subsequent examinations and obtain the minimum requirement.
- 3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum requirements as mentioned in (B).1, they shall be awarded with NP Grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s.
- 4) Successful completion of the course shall be indicated with a PP Grade in the grade card.
- 5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.



B.E. IN CSE (DATA SCIENCE)

SCHEME OF TEACHING AND EVALUATION 2022
OUTCOME BASED EDUCATION (OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(2022 SCHEME: EFFECTIVE FROM THE ACADEMIC YEAR 2024 - 25)

VI SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD)	Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination				Credits
						Theory Lecture	Tutorial	Practical / Drawing	Self -Study	Duration in hours	CIA Marks	SEE Marks	Total Marks	
						T	T	P	S					
1	HSMC	CS622T1C	Software Engineering and Project Management	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
2	IPCC	IS622I2I	Big Data Analytics	ISE	CSE	03	00	02	00	3	50	50	100	4
3	PCC	AM622T3A	Machine Learning	AIML/ DS	CSE	03	00	00	00	3	50	50	100	3
4	PEC	CS62214Cx/ IS62214Ix	Professional Elective Course	CSE Allied	CSE	03	00	00	00	3	50	50	100	3
5	OEC	IS62225Ix	Open Elective Course	ISE	CSE	03	00	00	00	3	50	50	100	3
6	PROJ	DS622P6D	Project Work Phase I	DS	CSE	00	00	08	00	3	100	---	100	4
7	PCCL	AM622L7A	Machine Learning Laboratory	AIML/ DS	CSE	00	00	02	00	3	50	50	100	1
8	AEC / SEC	CS62298Cx/ IS62298Ix	Ability Enhancement Course V / Skill Enhancement Course V	CSE Allied	CSE	00	00	02	00	2	50	50	100	1
9	MC		National Service Scheme (NSS)	Completed during the intervening period of III and VI Semester							50	---	50	0
			Physical Education (PE) (Sports and Athletics)											
			Yoga											
														22

ABILITY ENHANCEMENT COURSE V/ SKILL ENHANCEMENT COURSE V

CS62298CA	MongoDB	IS62298IC	Cisco Packet Tracer
CS62298CB	Game Development	IS62298ID	Devops

PROFESSIONAL ELECTIVE COURSE

CS62214CA	Blockchain and Applications	IS62214IC	Cryptography and Network Security
IS62214IB	Computer Vision	CS62214CD	Software Architecture and Design Patterns

OPEN ELECTIVE COURSE

IS62225IA	Fundamentals of Operating Systems	IS62225IC	Introduction to High Performance Computing
IS62225IB	Introduction to Java Programming	IS62225ID	Introduction to Data Science

Note: **BSC:** Basic Science Course, **IPCC:** Integrated Professional Core Course, **PCC:** Professional Core Course, **PCCL:** Professional Core Course Laboratory, **AEC:** Ability Enhancement Courses. **UHV:** Universal Human Value Course, **SEC:** Skill Enhancement Course, **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course

L – Lecture, **T** – Tutorial, **P**- Practical/ Drawing, **S** – Self -Study Component, **CIA:** Continuous Internal Assessment, **SEE:** Semester End Examination, **TD-** Teaching Department, **PSB:** Paper Setting Board.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L: T: P) can be considered as (3: 0: 2) or (2: 2: 2). The theory part of the IPCC shall be evaluated both by CIA and SEE. The practical part shall be evaluated by only CIA (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

Professional Elective Course (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. Each group will provide an option to select one course. The minimum number of students’ strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

Open Elective Courses (OEC): Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor.

Selection of an Open Elective shall not be allowed if,

- i. The candidate has studied the same course during the previous semesters of the program.
- ii. The syllabus content of open electives is similar to that of the Departmental core courses or Professional Elective courses.
- iii. A similar course, under any category, is prescribed in the higher semesters of the program.
- iv. In case, if any department is interested in offering courses from streams such as Law, Business (MBA), Medicine, Arts, Commerce etc. need to get the necessary approval from the respective Board of Studies and the Academic Council.
- v. The minimum numbers of students’ strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.

Non-Credit Mandatory Courses (NCCMC):

National Service Scheme/Physical Education (Sport and Athletics)/ Yoga:

- 1) Securing 40% or more in CIA, 40% or more marks in SEE and 40% or more in the sum total of CIA + SEE leads to successful completion of the registered course.
- 2) In case, students fail to secure 40 % marks in SEE, they have to appear for SEE during the subsequent examinations and obtain the minimum requirement.
- 3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum requirements as mentioned in (B).1, they shall be awarded with NP Grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s.
- 4) Successful completion of the course shall be indicated with a PP Grade in the grade card.
- 5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

Project Work Phase I: Students have to discuss with their mentors/guides and with their help has to complete the Literature Review, define the problem statement for the Project Work, and submit appropriate report. The guidelines and the evaluation process will be defined by the Board of Studies in line with the requirements of VTU and approved by the Academic Council of SCEM.



B.E. IN CSE (DATA SCIENCE)

SCHEME OF TEACHING AND EVALUATION 2022
OUTCOME BASED EDUCATION (OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(2022 SCHEME: EFFECTIVE FROM THE ACADEMIC YEAR 2025 - 26)

VII SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD)	Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination			Credits	
						Theory Lecture	Tutorial	Practical / Drawing	Self -Study	Duration in hours	CIA Marks	SEE Marks		Total Marks
1	IPCC	DS7221ID	Natural Language Processing and Applications	DS	CSE	03	00	02	00	3	50	50	100	4
2	PCC	DS722T2D	Data Visualization using Python	DS	CSE	03	00	00	00	3	50	50	100	3
3	PEC	CS72213Cx/ DS72213Dx	Professional Elective Course	CSE/ DS	CSE	03	00	00	00	3	50	50	100	3
4	OEC	IS72224Ix	Open Elective Course	ISE	CSE	03	00	00	00	3	50	50	100	3
5	PCCL	DS722L5D	Data Visualization Laboratory	DS	CSE	00	00	02	00	3	50	50	100	1
6	PROJ	DS722P6D	Project Work Phase II	DS	CSE	00	00	16	00	03	100	100	200	8
														22
PROFESSIONAL ELECTIVE COURSE														
CS72213CA		Robotic Process Automation			DS72213DC		Advanced Artificial Intelligence							
DS72213DB		Cloud Security and Privacy			CS72213CD		Deep Learning							
OPEN ELECTIVE COURSE														
IS72224IA		Information Management System			IS72224IC		Data Warehouse and Data Mining							
IS72224IB		Introduction to Cloud Computing			IS72224ID		Introduction to Software Testing							

Note: PCC: Professional Core Course, **PEC**–Professional Elective Course. **OEC:** Open Elective Course, **PROJ:** Project Work

L – Lecture, **T** – Tutorial, **P**- Practical/ Drawing, **S** – Self -Study Component, **CIA:** Continuous Internal Assessment, **SEE:** Semester End Examination, **TD-** Teaching Department, **PSB:** Paper Setting department.

Professional Elective Course (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. Each group will provide an option to select one course. The minimum number of students' strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

Open Elective Courses (OEC): Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor.

Selection of an Open Elective shall not be allowed if,

- i. The candidate has studied the same course during the previous semesters of the program.
- ii. The syllabus content of open electives is similar to that of the Departmental core courses or Professional Elective courses.
- iii. A similar course, under any category, is prescribed in the higher semesters of the program.
- iv. In case, if any department is interested in offering courses from streams such as Law, Business (MBA), Medicine, Arts, Commerce etc. need to get the necessary approval from the respective Board of Studies and the Academic Council.
- v. The minimum numbers of students' strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.

Project Work:

The objective of the Project Work is to

- i. Encourage independent learning and the innovative attitude of the students
- ii. Develop interactive attitude, communication skills, Organization, Time Management and Presentation Skills.
- iii. Impart Flexibility and Adaptability
- iv. Inspire Team working
- v. Expand Intellectual capacity, credibility, judgement and intuition
- vi. Adhere to Punctuality, setting and meeting deadlines
- vii. Install responsibilities to oneself and others
- viii. Train students to present the topic of Project work without any fear, face the audience confidently, enhance communication skills, involve in group discussions to present and exchange ideas.

The CIA and SEE evaluation procedure for the Project work will be as provided by the Board of Studies in line with VTU Regulations and approved by the Academic Council of SCEM.



B.E. IN CSE (DATA SCIENCE)

SCHEME OF TEACHING AND EVALUATION 2022
OUTCOME BASED EDUCATION (OBE) AND CHOICE BASED CREDIT SYSTEM (CBCS)
(2022 SCHEME: EFFECTIVE FROM THE ACADEMIC YEAR 2025 – 26)

VIII SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	Self -Study	Duration in hours	CIA Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	INT	DS82231D	Internship (14-20 Weeks) [Research Internship/ Rural Internship/ Industry Internship]	DS/CSE	00	00	20	00	3	100	100	200	10
2	SEM	DS822S2D	Research oriented Technical Seminar	DS/CSE	00	00	04	00	3	100	---	100	2
													12

Note: INT: Internship

L – Lecture, **T** – Tutorial, **P**- Practical/ Drawing, **S** – Self -Study Component, **CIA:** Continuous Internal Assessment, **SEE:** Semester End Examination, **TD-** Teaching Department, **PSB:** Paper Setting department.

Research Internship/Industry Internship/Rural Internship

- **Research Internship:** This is intended to offer the flavor of current research happening in the Research fields. It helps students to get familiarize with the field and imparts the skill required for carrying out research.
- **Industry Internship:** An extended period of work experience undertaken by the students to supplement their degree for professional development. It also helps them learn to overcome unexpected obstacles and successfully navigate the organizations, perspectives and cultures. Dealing with contingencies helps the students recognize, appreciate and adapt to the organizational realities by tempering their knowledge with practical constraints.
- **Rural Internship:** A long term goal, as proposed under the AICTE rural internship programme, shall be counted as rural internship activity.
- The student may take up Interdisciplinary Research Internship or Industry Internship.
- The Faculty Mentor need to monitor the student's internship progress and interact with them to guide them for the successful completion of the internship requirements
- The students are permitted to carry out internship anywhere in India or Abroad. However, the institute will not bear any expenses incurred with respect to the internship.

Research Oriented Technical Seminar: In order to make the student aware of the technological and research application in various domains of the society, a comprehensive presentation need to be provided with all the supporting evidences for the claims in the presentation.

- The objective of the Technical 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 a topic, preferably a recent topic in their interested specializations.
- The student has to
 - i. Carry out a detailed Literature survey, systematically organize the content
 - ii. Prepare the report as per their own intuition, without cut-paste activities.
 - iii. Use tools for writing equations, drawings etc. and gain proficiency of the tools used.
 - iv. Present the topics effectively through appropriate digital media.
 - v. Answer the queries posed and involve in healthy debates/discussions
 - vi. Submit a report in an error-free and professional way
 - vii. Present the findings of the seminar in the reputed Conferences/Journals for possible publications (desirable).

The evaluation procedure for the Research oriented Technical Seminar will be as provided by the Board of Studies and approved by the Academic Council of SCEM.