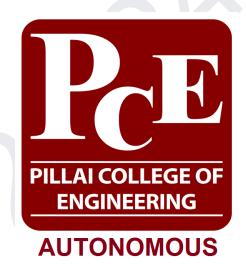Mahatma Education Society's

Pillai College of Engineering

(Autonomous)

Affiliated to University of Mumbai

Dr. K. M. Vasudevan Pillai's Campus, Sector 16, New Panvel – 410 206.

Department of Computer Engineering

Syllabus

of

<u>B.Tech. in Computer Engineering</u>

for

The Admission Batch of AY 2023-24

First Year - Effective from Academic Year **2023-24**

Second Year - Effective from Academic Year **2024-25**

Third Year - Effective from Academic Year **2025-26**

Fourth Year - Effective from Academic Year **2026-27**

as per

Choice Based Credit and Grading System

Mahatma Education Society's

Pillai College of Engineering

Vision

Pillai College of Engineering (PCE) will admit, educate and train a diverse population of students who are academically prepared to benefit from the Institute's infrastructure and faculty experience, to become responsible professionals or entrepreneurs in a technical arena. It will further attract, develop and retain, dedicated, excellent teachers, scholars and professionals from diverse backgrounds whose work gives them knowledge beyond the classroom and who are committed to making a significant difference in the lives of their students and the community.

Mission

To develop professional engineers with respect for the environment and make them responsible citizens in technological development both from an Indian and global perspective. This objective is fulfilled through quality education, practical training and interaction with industries and social organizations.

Dr. K. M. Vasudevan Pillai's Campus , Sector - 16, New Panvel – 410 206

Department of Computer Engineering

Vision

To evolve as a centre of academic excellence and to adapt itself to the rapid advancements in the Computer Engineering field.

Mission

To produce highly qualified, well rounded and motivated graduates who can meet new technical challenges, contribute effectively as team members and be innovators in computer hardware, software, design and application. To pursue creative research and new technologies in computer engineering and across disciplines in order to serve the needs of industry, government, society and the scientific community. To inculcate strong ethical values and responsibility towards society.

Program Educational Objectives (PEOs):

I. Our graduates will have knowledge, skills and attitude that will allow them to contribute significantly to the research and the discovery of new knowledge and methods in computing and enable them to communicate effectively and work in a team.

II. Our graduates will function ethically and responsibly, and will remain informed and involved as full participants in our profession and our society. Our graduates will successfully function in multi-disciplinary teams.

III. Our graduates will apply the basic principles and practices of engineering in the computing domain to the benefit of society and to pursue lifelong learning and professional developments.

IV. Our graduates will use theoretical and technical computer science knowledge to specify requirements, develop a design, and implement and verify a solution for computing systems of different levels of complexity.

Program Outcomes:

Engineering Graduates will be able to:

1. Engineering knowledge:
   Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis:
   Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions:
   Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems:
   Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage:
   Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society:
   Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability:
   Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics:
   Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work:
   Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication:
    Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance:
    Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning:
    Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

1. To analyze, design and develop computer programs using appropriate hardware, software and mathematical models in the areas related to algorithms, system software, multimedia, mobile and web technology, data storage and computing, and networking for efficient and secure systems.
2. To use professional engineering practices, logic and strategies for creating innovative career paths to be an entrepreneur, and an urge to pursue higher studies.
3. To Formulate and solve real life engineering problems for the public health and safety with social and environmental awareness along with ethical responsibility.

The Autonomous status of the institute has given an opportunity to design and frame the curriculum in such a way that it incorporates all the needs and requirements of recent developments in all fields within the scope of the technical education. This curriculum will help graduates to attain excellence in their respective field. The curriculum has a blend of basic and advanced courses along with provision of imparting practical knowledge to students through minor and major projects. The syllabus has been approved and passed by the Board of Studies.

Outcome based education is implemented in the academics and very necessary step is undertaken to attain the requirements. Every course has its objectives and outcomes defined in the syllabus which are met through continuous assessment and end semester examinations. Evaluation is done on the basis of Choice Based Credit and Grading System (CBCGS). Optional courses are offered at department and institute level. Selection of electives from the same specialization makes the student eligible to attain a B. Tech. degree with respective specialization.

Every learner/student will be assessed for each course through (i) an Internal/Continuous assessment during the semester in the form of either Practical Performance, Presentation, Demonstration or written examination and (ii) End Semester Examination (ESE), in the form of either theory or viva voce or practical, as prescribed by the respective Board Studies and mentioned in the assessment scheme of the course content/syllabus. This system involves the Continuous Evaluation of students' progress Semester wise. The number of credits assigned with a course is based on the number of contact hours of instruction per week for the course. The credit allocation is available in the syllabus scheme of each semester.

The performance of a learner in a semester is indicated by a number called Semester Grade Performance Index (SGPI). The SGPI is the weighted average of the grade points obtained in all the courses by the learner during the semester. For example, if a learner passes five courses (Theory/labs./Projects/ Seminar etc.) in a semester with credits C1, C2, C3, C4 and C5 and learners grade points in these courses are G1, G2, G3, G4 and G5 respectively, then learners SGPI is equal to:

$$SGPI = \frac{C_1 G_1 + C_2 G_2 + C_3 G_3 + C_4 G_4 + C_5 G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The learner's up to date assessment of the overall performance from the time s/he entered for the programme is obtained by calculating a number called the Cumulative Grade Performance Index (CGPI), in a manner similar to the calculation of SGPI. The CGPI therefore considers all the courses mentioned in the scheme of instructions and examinations, towards the minimum requirement of the degree learners have enrolled for. The CGPI at the end of this semester is calculated as,

$$CGPI = \frac{C_1 G_1 + C_2 G_2 + C_3 G_3 + \ldots + C_i * G_i + \ldots + C_n G_n}{C_1 + C_2 + C_3 + \cdots + C_i + \ldots + C_n}$$

The Department of Computer Engineering offers a B. Tech. programme in Computer Engineering. This is an eight-semester course. The complete course is a **172 credit** course which comprises core courses and elective courses. The **department level elective courses/Program Elective courses** are distributed over 4 specializations. The specializations are:

1. Artificial Intelligence and Data Science
2. Cloud and Cyber Security
3. Computational Intelligence and Automation.
4. Human Computer Interaction.

The students also have a choice of opting for **Institute level specializations/Open electives** . These are

1 Entrepreneurship Development and Management
2 Business Management
3 IP Management
4 Bioengineering
5 Bio Instrumentation
6 Engineering Design
7 Sustainable Technologies
8 Contemporary Studies
9 Art and Journalism
10 Applied Science
11 Green Technologies
12 Maintenance Engineering
13 Life Skills
14 Environment & Safety

The credit requirement for the B.Tech. in Computer Engineering course is tabulated in Table 1.

Table 1. Credit Requirement for B.Tech in Computer Engineering

Course Type		Total Credits
BSC/ESC	Basic Science Course	18
	Engineering Science Course	18
Program Courses	Program Core Course (PCC)	54
	Program Elective Course (PEC)	20
Multidisciplinar	Multidisciplinary Minor (MDM)	10

y Courses	Open Electives (OE) Other than a particular program	6
Skill Courses	Vocational and Skill Enhancement Course (VSEC)	8
Humanities Social Science and Management (HSSM)	Ability Enhancement Course (AEC-01, AEC-02)	4
	Entrepreneurship/Economics/Management Courses	4
	Indian Knowledge System (IKS)	2
	Value Education Course (VEC)	2
Experiential Learning Courses	Research Methodology	3
	Communication Engineering Project (CEP)/Field Project (FP)	3
	Project	8
	Internship/ On Job Training (OJT)	8
Liberal Learning Courses	Co-curricular Courses (CC)	4
Suggested Total Credits		172

Preface by Board of Studies in Computer Engineering

Dear Students and Teachers, we, the members of Board of Studies Computer Engineering, are very happy to present the B.Tech Computer Engineering syllabus effective from the Academic Year 2021-22 . We are sure you will find this syllabus interesting, challenging, and fulfill certain needs and expectations.

Computer Engineering is one of the most sought-after courses amongst engineering students. The syllabus needs revision in terms of preparing the student for the professional scenario relevant and suitable to cater the needs of industry in the present-day context. The syllabus focuses on providing a sound theoretical background as well as good practical exposure to students in the relevant areas. It is intended to provide a modern, industry-oriented education in Computer Engineering. It aims at producing trained professionals who can successfully become acquainted with the demands of the industry worldwide. They obtain skills and experience in up-to-date knowledge to analysis design, implementation, validation, and documentation of computer software and systems.

This syllabus is finalized through a brainstorming session attended by Heads of Department and senior faculty members of Department of Computer Engineering. The syllabus falls in line with the vision and mission of the Computer Engineering Department and various accreditation agencies by keeping an eye on the technological developments, innovations, and industry requirements.

We would like to place on record our gratitude to the faculty, students, industry experts and stakeholders for having helped us in the formulation of this syllabus.

Board of Studies in Computer Engineering

1. Dr. Sharvari S. Govilkar   Coordinator (Chairman)
2. Dr. Prashant P Nitnaware   Member
3. Prof. Varunakshi Bhojane   Member
4. Prof. Payel Thakur   Member
5. Dr. Neeta Deshpande   Member
6. Dr.Jyoti Malhotra   Member
7. Dr.Kavita Sonawane   Member
8. Prof.Pranita Mahajan   Member
9. Mr. Samir Mahindre   Member
10. Prof. Deepti Lawand   Member

Program Structure for First Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2023-24
Semester I

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
FY101	Engineering Mathematics I	BSC	3	2	3	1	4
FY102	Engineering Physics I	BSC	2	1	2	0.5	2.5
FY103	Engineering Chemistry I	BSC	2	1	2	0.5	2.5
FY104	C Programming	ESC	3	2	3	1	4
FY105	Basic Electrical Engineering*	ESC	3	-	3	-	3
FY109	Basic Electrical Engineering Lab*	VSEC	-	2	-	1	1
FY111	Basic Workshop -I	VSEC	-	2	-	1	1
FY113	Indian Knowledge System	HSSM	-	2+2#	-	2	2
FY114	Co-curricular Course-I	Liberal Learning	-	4	-	2	2
Total			13	18	13	9	22

Course Code	Course Name	Examination Scheme							
		Theory							
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)	Term Work	Oral/ Pract.	Total
		1	2	Average					
FY101	Engineering Mathematics I	40	40	40	60	2	25	-	125
FY102	Engineering Physics I	30	30	30	45	2	25	-	100
FY103	Engineering Chemistry I	30	30	30	45	2	25	-	100
FY104	C Programming	40	40	40	60	2	25	25	150
FY105	Basic Electrical Engineering*	40	40	40	60	2	-	-	100
FY109	Basic Electrical Engineering Lab*	-	-	-	-	-	25	25	50
FY111	Basic Workshop -I	-	-	-	-	-	50	-	50
FY113	Indian Knowledge System	-	-	-	-	-	50	-	50
FY114	Co-curricular Course-I	-	-	-	-	-	50	-	50
Total									775

*- The course can be offered in either SEM I or SEM

Program Structure for First Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2023-24
Semester II

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
FY115	Engineering Mathematics II	BSC	3	2	3	1	4
FY116	Engineering Physics II	BSC	2	1	2	0.5	2.5
FY117	Engineering Chemistry II	BSC	2	1	2	0.5	2.5
FY107	Engineering Mechanics and Graphics*	ESC	3	-	3	-	3
FY118	Java Programming	PCC	3	2	3	1	4
FY121	Professional Communication and Ethics-I	AEC	1	2	1	1	2
FY110	Engineering Mechanics and Graphics Lab*	VSEC	-	2	-	1	1
FY123	Basic Workshop -II	VSEC	-	2	-	1	1
FY125	Co-curricular Course-II	Liberal Learning	-	4	-	2	2
	Total		**14**	**16**	**12**	**10**	**22**

Course Code	Course Name	Examination Scheme							
		Theory							
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)	Term Work	Oral/ Pract.	Total
		1	2	Average					
FY115	Engineering Mathematics II	40	40	40	60	2	25	-	125
FY116	Engineering Physics II	30	30	30	45	2	25	-	100
FY117	Engineering Chemistry II	30	30	30	45	2	25	-	100
FY107	Engineering Mechanics and Graphics*	40	40	40	60	2	-	-	100
FY118	Java Programming	40	40	40	60	2	25	25	150
FY121	Professional Communication Ethics	20	20	20	30	1	25	-	75
FY110	Engineering Mechanics and Graphics Lab*	-	-	-	-	-	25	25	50
FY123	Basic Workshop -II	-	-	-	-	-	-	50	50
FY125	Co-curricular Course-II	-		-	-	-	50	-	50
	Total								**800**

*- The course can be offered in either SEM I or SEM II

Program Structure for Second Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2024-25
Semester III

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)			Credits Assigned			
			Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
CE 201	Engineering Mathematics III	ESC	3	-	1*	3	-	1	4
CE 202	Data structure	PCC	3	2	-	3	1	-	4
CE 203	Database Management Systems	PCC	3	2	-	3	1	-	4
CE 204	Digital Logic and Computer Architecture	MDM	3	-	-	3	-	-	3
CE 205	Human Values and Social Ethics	*VEC*	2	-	-	2	-	-	2
CE 206	Python Programming Lab	VSEC	-	2+2#	-	-	2	-	2
Total									**19**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Oral/ Pract.	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Average					
CE 201	Engineering Mathematics III	40	40	40	60	2	25	-	125
CE 202	Data structure	40	40	40	60	2	25	25	150
CE 203	Database Management Systems	40	40	40	60	2	25	25	150
CE 204	Digital Logic and Computer Architecture	40	40	40	60	2	-	-	100
CE 205	Human Values and Social Ethic	-	-	-	-	50	-	50
CE 206	Python Programming Lab	-	-	-	-	50	25	75
Total		-	160	240	-	175	75	650

* Batchwise tutorial of One hour to be conducted.
 # Theory class to be conducted for full class .

Program Structure for Second Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2024-25

Semester IV

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)			Credits Assigned			
			Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
CE 208	Engineering Mathematics IV	ESC	3	-	1*	3	-	1	4
CE 209	Design and Analysis of Algorithms	PCC	3	2	-	3	1	-	4
CE 210	Operating Systems	PCC	3	2	-	3	1	-	4
CE 211	Computer Graphics and virtual reality	PCC	3	-	-	3	-	-	3
CE 212	Entrepreneurship	HSSM	2	-	-	2	-	-	2
CE 213	Web Programming	VSEC	-	2+2#	-	-	2	-	2
CE 214	Personal Finance Management	HSSM	2	-	-	2	-	-	2
Total									**21**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Oral/ Pract.	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Average					
CE 208	Engineering Mathematics IV	40	40	40	60	2	25	-	125
CE 209	Design and Analysis of Algorithms	40	40	40	60	2	25	25	150
CE 210	Operating Systems	40	40	40	60	2	25	25	150
CE 211	Computer Graphics and virtual reality	40	40	40	60	2	-	-	100
CE 212	Entrepreneurship	20	20	20	40	2	-	-	60
CE 213	Web Programming	-	-	-	-	-	50	25	75
CE 214	Personal Finance Management	20	20	20	40	2	-	-	60
Total				200	320	-	125	75	720

* Batchwise tutorial of One hour to be conducted.

 # Theory class to be conducted for full class .

Program Structure for Third Year

Bachelor of Technology in Computer Engineering

W.E.F. A.Y. 2025-26

Semester V

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)			Credits Assigned			
			Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
CE 301	Theory of Computation	PCC	3	–	–	3	–	–	3
CE 302	Machine Learning	PCC	3	2	–	3	1	–	4
CE 303	Microprocessor	MDM	3	–	–	3	–	–	3
CE 304	Computer Network	PCC	3	2	–	3	1	–	4
CE 305	Professional Communication Skills II	AEC	2+2#		-		2	-	2
CE 3xx	Department Level Optional Course I	PEC	3	2	–	3	1	–	4
IL 3XX	ILOC-I	OE	3	–	–	3	–	–	3
Total									23

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Oral/ Pract.	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Average					
CE 301	Theory of Computation	40	40	40	60	2	–	–	100
CE 302	Machine Learning	40	40	40	60	2	25	25	150
CE 303	Microprocessor	40	40	40	60	2	–	–	100
CE 304	Computer Network	40	40	40	60	2	25	25	150
CE 305	Professional Communication Skills II	-	-	-	-	-	50	-	50
CE 3xx	Department Level Optional Course I	40	40	40	60	2	25	25	150
IL 3XX	**ILOC-I**	40	40	40	60	2	–	–	100
Total				240	360		125	75	800

* Batchwise tutorial of One hour to be conducted.

 # Theory class to be conducted for full class .

Specializations□	Artificial Intelligence and Data Science	Cloud and Cyber Security	Robotics and Automation	Human Computer Interaction
Course Code	CE 306	CE 307	CE 308	CE 309
Department Level Optional Course I (DLOC I)	Data Warehouse and Data Mining	Cryptography and System Security	IoT Systems and Applications	Augmented Reality and Virtual Reality

SEM V - ILOC I

SN	Specialization	Course 1 (Semester V)	
1	Entrepreneurship Development and Management	IL 350	Entrepreneurship
2	Business Management	IL 351	E- Commerce and E-Business
3	IP Management	IL 352	Research Methodology
4	Bioengineering	IL 353	Introduction to Bioengineering
5	Bio Instrumentation	IL 354	Biomedical Instrumentation
6	Engineering Design	IL 355	Design of Experiments
7	Sustainable Technologies	IL 356	Design for Sustainability
8	Contemporary Studies	IL 357	Political Science
9	Art and Journalism	IL 358	Visual Arts
10	Applied Science	**IL 359**	Modern Day Sensor Physics
11	Green Technologies	IL 360	Energy Audit and Management
12	Maintenance Engineering	IL 361	Maintenance of Electronics Equipment
13	Life Skills	IL 362	Cooking and Nutrition
14	Environment & Safety	IL 363	Environmental Management

Program Structure for Third Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2025-26
Semester VI

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
CE 310	System Programming Compiler Construction	PCC	3	2	3	1	4
CE 311	Artificial Intelligence	PCC	3	2	3	1	4
CE 3xx	Department Level Optional Course- II	PEC	3	2	3	1	4
CE 3xx	Department Level Optional Course- III	PEC	3	2	3	1	4
IL 36X	Institute Level Optional Course- II	OE	2	1	3	-	3
CE 391	Project A	ELC		6	–	3	3
Total							**22**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Oral/ Pract.	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Average					
CE 310	System Programming Compiler Construction	40	40	40	60	2	25	25	150
CE 311	Artificial Intelligence	40	40	40	60	2	25	25	150
CE 3xx	Department Level Optional Course II	40	40	40	60	2	25	25	150
CE 3xx	Department Level Optional Course III	40	40	40	60	2	25	25	150
IL 36X	Institute Level Optional Course II	40	40	40	60	2	–	–	100
CE 391	Project A						25	25	50
Total		**200**			**300**		**125**	**150**	**750**

Specializations	Artificial Intelligence and Data Science	Cloud and Cyber Security	Robotics and Automation	Human Computer Interaction
Course Code	CE 312	CE 313	CE 314	CE 315
Department Level Optional Course II (DLOC II)	Big Data Analysis	Network & Cloud Security	Internet of Everything	User Experience Design

Specializations	Artificial Intelligence and Data Science	Cloud and Cyber Security	Robotics and Automation	Human Computer Interaction
Course Code	CE 316	CE 317	CE 318	CE 319
Department Level Optional Course III (DLOC III)	Natural Language Processing	Ethical Hacking and Cyber Laws	Robotics and its Applications	Human Computer Interaction

ILOC II - SEM VI

SN	Specialization	Course 2 (Semester VI)	
1	Entrepreneurship Development and Management	IL 370	Digital Business Management and Digital Marketing
2	Business Management	IL 37	Business Analytics
3	IP Management	IL 372	IPR and Patenting
4	Bioengineering	IL 373	Medical Image Processing
5	Bio Instrumentation	IL 374	Bio Mechanics
6	Engineering Design	IL 375	Product Design
7	Sustainable Technologies	IL 376	Technologies for Rural Development
8	Contemporary Studies	IL 377	Economics
9	Art and Journalism	IL 378	Journalism, Media and Communication studies
10	Applied Science	IL 379	Operation Research for Management
11	Green Technologies	IL 380	Weather and Climate Informatics
12	Maintenance Engineering	IL 381	Maintenance of Mechanical Equipment
13	Life Skills	IL 382	Physical Education
14	Environment & Safety	IL 383	Vehicle Safety / Industrial Safety Norms

* : Learner will select one course from any of these ILOC verticals.

Program Structure for Fourth Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2026-27

Semester VII

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
CE 401	Deep Learning	PCC	3	2	3	1	4
CE 402	Software Engineering and Project Management	PCC	3	-	3	-	3
CE 403	Digital Image Processing	MDM	3	2	3	1	4
CE 4xx	Department Level Optional Course IV	PEC	3	2	3	1	4
CE 4xx	Department Level Optional Course V	PEC	3	2	3	1	4
CE 491	Project B	ELC	-	6	-	3	3
Total							**22**

Course Code	Course Name	Examination Scheme							
		Theory						Oral / Pract.	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)	Term Work		
		1	2	Average					
CE 401	Deep Learning	40	40	40	60	2	25	25	150
CE 402	Software Engineering and Project Management	40	40	40	60	2	-	-	100
CE 403	Digital Image Processing	40	40	40	60	2	25	-	125
CE 4xx	Department Level Optional Course IV	40	40	40	60	2	25	25	150
CE 4xx	Department Level Optional Course V	40	40	40	60	2	25	25	150
CE 491	Project B						25	25	50
Total				**200**	**300**		**125**	**100**	**725**

Specializations	Artificial Intelligence and Data Science	Cloud and Cyber Security	Robotics and Automation	Human Computer Interaction
Course Code	CE 404	CE 405	CE 406	CE 407
Department Level Optional Course IV (DLOC IV)	Data Science	Penetration testing and vulnerability Assessment	Embedded Systems	Mobile and Ubiquitous Computing

Specializations	Artificial Intelligence and Data Science	Cloud and Cyber Security	Robotics and Automation	Human Computer Interaction
Course Code	CE 408	CE 409	CE 410	CE 411
Department Level Optional Course V (DLOC V)	Social Media Analytics	Digital Forensics	Computer Vision	Usability Engineering

Program Structure for Fourth Year
Bachelor of Technology in Computer Engineering
W.E.F. A.Y. 2026-27

Semester VIII

Course Code	Course Name	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
CE 412	Parallel and Distributed Systems	PCC	3	2	3	1	4
CE 413	Research Methodology	ELC	3	2	3	1	3
CE 493	Internship/ OJT	Experiential Learning Courses	-	16		8	8
CE 494	Project C		-	8		4	4
Total			6	28	6	14	19

Course Code	Course Name	Examination Scheme							
		Theory							
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)	Term Work	Oral/ Pract.	Total
		1	2	Average					
CE 412	Parallel and Distributed Systems	40	40	40	60	2	25	25	150
CE 413	Research Methodology	40	40	40	60	2	25	25	150
CE 493	Internship/ OJT	-	-	-	-	-	100	100	200
CE 494	Project C						50	50	100
Total				80	120		200	200	600