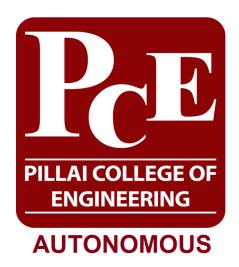Mahatma Education Society's

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 Electronics & Computer Science

Syllabus

of

B.Tech. in Electronics & Computer Science

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 Electronics & Computer Science

Vision

To produce professionally competent and socially responsible engineers capable of working globally.

Mission

To provide in-depth quality education in Electronics & Computer Science Engineering and prepare the students for lifelong learning.

To develop professional engineers who can critically and creatively apply the knowledge of engineering principles to solve real world problems.

To inculcate entrepreneurship skills and impart ethical and social values.

Program Educational Objectives (PEOs):

I.   Graduates will have the ability to apply engineering knowledge and skills to provide solutions to real world technical problems.
II. Graduates will be successful as engineering professionals, innovators or entrepreneurs with a multidisciplinary approach contributing towards research and technological developments.
III. Graduates will have the ability to pursue higher education in Electronics Engineering, Computer Science and allied streams.
IV. Graduates will function in their profession with social awareness and responsibility while maintaining ethical standards.

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 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 of 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 the 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 teamwork: 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 work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognized 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):

Engineering Graduates will be able to

1. Gain knowledge and skills to analyse and design Electronics circuits as well as Computer Programs.

2. Develop hardware and software systems in the areas like Artificial Intelligence & Machine learning, Big Data, Information Security, Automation, Embedded Systems, Signal Processing and Communication Systems.

3. Apply modern Electronics and Computer engineering techniques and tools to find solutions for real life interdisciplinary problems.

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 every 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,

$$CGPI = \frac{C_1G_1 + C_2G_2 + C_3G_3 + \ldots + C_i * G_i + \ldots + C_nG_n}{C_1 + C_2 + C_3 + \cdots + C_i + \ldots + C_n}$$

The Department of Electronics & Computer Science offers a B. Tech. programme in Electronics & Computer Science. This is an eight semester course. The complete course is a 163 credit course which comprises core courses and elective courses. The elective courses are distributed over 8 specializations. The specializations are:

1. AIML
2. Robotics
3. Data Analytics
4. System Security
5. High Performance Computing
6. Cloud Computing
7. VLSI Design
8. IOT

The students also have a choice of opting for Institute level specializations. These are

1. Business and Entrepreneurship
2. Bio Engineering
3. Engineering Design
4. Art and Humanities
5. Applied Science
6. Life Skills, Repair, Maintenance and Safety

As minimum requirements for the credits to be earned during the B.Tech in Electronics & Computer Science program, a student will have to complete a minimum of three specializations of which two are to be chosen from the department list and one has to be from the Institute level specialization list. In order to complete each specialization, a minimum of three courses under that specialization has to be completed. The credit requirement for the B.Tech. in Electronics & Computer Science is tabulated in Table.

Semester-wise Credits and Marks

Sr. No.	Semester	Credits Assigned	Marks Assigned
1	I	22	750
2	II	22	775
3	III	22	760
4	IV	21	775
5	V	22	800
6	VI	20	850
7	VII	20	700
8	VIII	20	625
Total Credits & Marks		169	6035

Semester I

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract/Tuts	Theory	Pract/Tuts	Total
FY 101	Engineering Mathematics I	BSC	TLP	3	2	3	1	4
FY 102	Engineering Physics I	BSC	TL	2	1	2	0.5	2.5
FY 103	Engineering Chemistry I	BSC	TL	2	1	2	0.5	2.5
FY 104	C Programming	ESC	T	3	-	3	-	3
FY 105	Basic Electrical Engineering	ESC	TL	3	2	3	1	4
FY 106	C Programming Lab + Basic Workshop Practice I	VSEC	LP	-	4	-	2	2
FY 107	Indian Knowledge System	IKS	T	-	2+2#	-	2	2
FY 108	Co-curricular Course	CC	L	-	4	-	2	2
Total				**13**	**18**	**13**	**9**	**22**

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
FY 101	Engineering Mathematics I	BSC	40	40	40	60	2	25	-	125
FY 102	Engineering Physics I	BSC	30	30	30	45	2	25	-	100
FY 103	Engineering Chemistry I	BSC	30	30	30	45	2	25	-	100
FY 104	C Programming	ESC	40	40	40	60	2	-	-	100
FY 105	Basic Electrical Engineering	ESC	40	40	40	60	2	25	25	150
FY 106	C Programming Lab + Basic Workshop Practice I	VSEC	-	-	-	-	-	50	25	75
FY 107	Indian Knowledge System	IKS	-	-	-	-	-	50	-	50
FY 108	Co-curricular Course I	CC	-	-	-	-	-	50	-	50
Total										**750**

T- Theory , L- Lab , P-Programming, C- Communication

Course Code	Indian Knowledge System
FY 107	Indian Agriculture
	Indian Health Science
	Indian Education
	Outreach of Indian Knowledge System

Semester II

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract/ Tuts	Theory	Pract /Tuts	Total
FY 109	Engineering Mathematics II	BSC	TLP	3	2	3	1	4
FY 110	Engineering Physics II	BSC	TL	2	1	2	0.5	2.5
FY 111	Engineering Chemistry II	BSC	TL	2	1	2	0.5	2.5
FY 112	Engineering Mechanics and Graphics	ESC	TL	2	4	2	2	4
FY 113	Python Programming	Program Courses	TLP	3	-	3	-	3
FY 114	Python Programming lab + Basic Workshop Practice II	*VSEC*	LP	-	4	-	2	2
FY 115	Professional Communication & Ethics I	AEC	TL	1	2	1	1	2
FY 116	*Co-curricular Course II*	*Liberal Learning*		-	4	-	2	2
Total				**13**	**18**	**13**	**9**	**22**

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/ Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
FY 109	Engineering Mathematics II	BSC	40	40	40	60	2	25	-	125
FY 110	Engineering Physics II	BSC	30	30	30	45	2	25	-	100
FY 111	Engineering Chemistry II	BSC	30	30	30	45	2	25	-	100
FY 112	Engineering Mechanics and Graphics	ESC	40	40	40	60	3	25	50	175
FY 113	Python Programming	Program Courses	40	40	40	60	2	-	-	100
FY 114	Python Programming lab + Basic Workshop Practice II	*VSEC*	-	-	-	-	-	50	25	75
FY 115	Professional Communication & Ethics I	AEC	-	-	-	-	-	50	-	50
FY 116	*Co-curricular Course II*	*Liberal Learning*	-	-	-	-	-	50	-	50
Total										**775**

T- Theory , L- Lab , P-Programming, C- Communication

Semester III

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours) Theory	Pract /Tuts	Credits Assigned Theory	Pract /Tuts	Total
EC 201	Engineering Mathematics III	ESC	T	3	-	3	-	3
EC 202	Analog Electronics Circuits	Program Core Courses	TL	3	-	3		3
EC 203	Digital Circuits & System Design	Program Core Courses	TL	3	-	3	-	3
EC 204	Data Structures & Algorithms	MDM	TL	3	2	3	1	4
EC 205	Database Management System	Program Core Courses	TLP	3	2	3	1	4
EC 206	Personal Finance Management	Humanities Social Science and Management	T	2	-	2	-	2
EC 207	Human Values and Social Ethics		T	2	-	2	-	2
EC 208	Analog & Digital Electronics Lab	Program Core Courses	LP	-	2	-	1	1
Total				**19**	**6**	**19**	**3**	**22**

Course Code	Course Name	Category	Internal Assessment 1	2	Avg	End Sem Exam	Exam Duration (Hrs)	Term Work	Pract /Oral	Total
EC 201	Engineering Mathematics III	ESC	40	40	40	60	2	-	-	100
EC 202	Analog Electronics Circuits	Program Core Courses	40	40	40	60	2	-	-	100
EC 203	Digital Circuits & System Design	Program Core Courses	40	40	40	60	2	-	-	100
EC 204	Data Structures & Algorithms	MDM	40	40	40	60	2	25	25	150
EC 205	Database Management System	Program Core Courses	40	40	40	60	2	25	25	150
EC 206	Personal Finance Management	Humanities Social Science and Management	20	20	20	40	1.5	-	-	60
EC 207	Human Values and Social Ethics		-	-	-	-	-	50	-	50
EC 208	Analog & Digital Electronics Lab	Program Core Courses	-	-	-	-	-	25	25	50
Total										**760**

1# to be taken class wise **T- Theory , L- Lab , P-Programming, C- Communication**

Semester IV

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract/Tuts	Theory	Pract/Tuts	Total
EC 209	Engineering Mathematics IV	ESC	T	3	-	3	-	3
EC 210	Analysis of Algorithms	Program Core Courses	T	3	2	3	1	4
EC 211	Basics of VLSI	Program Core Courses	TLP	3	2	3	1	4
EC 212	System Software & Operating Systems	MDM	T	3	-	3	-	3
EC 213	Professional Communication and Ethics II	AEC	LC	-	2+2*	-	2	2
EC 214	Entrepreneurship	*Humanities Social Science and Management (HSSM*	T	2	-	2	-	2
EC 215	Value Education Course (VEC)		T	-	2	-	1	1
EC 216	System Software & Operating Systems Lab	Skill Courses	L	-	2	-	1	1
EC 291	Programming Lab I (Java Programming)	Experiential Learning Courses	LP LPC	-	1*+ 2	-	1	1
Total				**14**	**14**	**14**	**7**	**21**

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/ Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
EC 209	Engineering Mathematics IV	ESC	40	40	40	60	2	-	-	100
EC 210	Analysis of Algorithms	Program Core Courses	40	40	40	60	2	25	25	150
EC 211	Basics of VLSI	Program Core Courses	40	40	40	60	2	25	25	150
EC 212	System Software & Operating Systems	MDM	40	40	40	60	2	-	-	100
EC 213	Professional Communication and Ethics II	AEC	-	-	-	-	-	50	-	50
EC 214	Entrepreneurship	*Humanities Social Science and Management HSSM*	30-	30	30	45	2	-	-	75
EC 215	Value Education Course (VEC)		-	-	-	-	-	50	-	50
EC 216	System Software & Operating Systems Lab	Skill Courses	-	-	-	-	-	25	25	50
EC 291	Programming Lab I (Java Programming)	Skill Courses	-	-	-	-	-	25	25	50
Total										**775**

1# to be taken class wise

T- Theory , L- Lab , P-Programming, C- Communication

Semester V

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract/ Tuts	Theory	Pract / Tuts	Total
EC 301	Signals & Systems	Programme Core Course (PCC)	TL	3	1	3	1	4
EC 302	Computer Networks	Programme Core Course (PCC)	TL	3	2	3	1	4
EC 303	Microprocessor and Microcontroller	Programme Core Course (PCC)	T	3	2	3	1	4
EC 304	Software Engineering	Multidisciplinary Minor (MD M)	T	3	-	3	-	3
EC 3xx	Department Level Optional Course I	Programme Elective Course (PEC)	TL	3	2	3	1	4
IL 3xx	Institute Level Optional Course I	Open Elective (OE) Other than a particular program	T	2	-	2	-	2
EC 391	Programming Lab II(Web Programming)	Skill Courses	LPC	-	2	-	1	1
Total				**17**	**9**	**17**	**5**	**22**

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract / Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
EC 301	Signals & Systems	Programme Core Course (PCC)	40	40	40	60	2	25	-	125
EC 302	Computer Networks	Programme Core Course (PCC)	40	40	40	60	2	25	25	150
EC 303	Microprocessor and Microcontroller	Programme Core Course (PCC)	40	40	40	60	2	25`	25	150
EC 304	Software Engineering	Multidisciplinary Minor (MD M)	40	40	40	60	2		-	100
EC 3xx	Department Level Optional Course I	Programme Elective Course (PEC)	40	40	40	60	2	25	25	150
IL 3xx	Institute Level Optional Course I	Open Elective (OE) Other than a particular program	30	30	30	45	2	-	-	75
EC 391	Programming Lab II(Web Programming)	Skill Courses	-	-	-	-	-	25	25	50
Total										**800**

1# to be taken class wise

T- Theory , L- Lab , P-Programming, C- Communication

Course Code	Department Level Optional Course (DLOC) I	Specializations
EC 305	Artificial Intelligence	AIML
EC 306	Advanced Database Management Systems + DWM	Data Analytics
EC 307	Advanced Operating System	High Performance Computing
EC 308	Advanced VLSI Design	VLSI Design

Semester VI

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours) Theory	Teaching Scheme (Contact Hours) Pract/ Tuts	Credits Assigned Theory	Credits Assigned Pract/ Tuts	Credits Assigned Total
EC 309	Image Processing & Machine Vision	PCC	TLP	3	2	3	1	4
EC 310	Computer Organization & Architecture	PCC	T	3	-	3	-	3
EC 3xx	Department Level Optional Course II	PEC	TL	3	2	3	1	4
EC 3xx	Department Level Optional Course III	PEC	TL	3	2	3	1	4
IL 3xx	Institute Level Optional Course II	Open Elective (OE) Other than a particular program	T	2	-	2	-	2
EC 392	Programming Lab III (R-Programming)	MDM	LPC	-	1+2*	-	1	1
EC 393	Project A (Literature Survey & Problem Formulation)	Experiential Learning Courses	LPC	-	4	-	2	2
Total				**14**	**13**	**14**	**6**	**20**

Course Code	Course Name	Category	Examination Scheme — Theory — Internal Assessment 1	Examination Scheme — Theory — Internal Assessment 2	Examination Scheme — Theory — Internal Assessment Avg	End Sem Exam	Exam Duration (Hrs)	Term Work	Pract/ Oral	Total
EC 309	Image Processing & Machine Vision	PCC	40	40	40	60	2	25	25	150
EC 310	Computer Organization & Architecture	PCC	40	40	40	60	2	-	-	100
EC 3xx	Department Level Optional Course II	PEC	40	40	40	60	2	25	25	150
EC 3xx	Department Level Optional Course III	PEC	40	40	40	60	2	25	25	150
IL 3xx	Institute Level Optional Course II	Open Elective (OE) Other than a particular program	40	40	40	60	2	25	25	150
EC 392	Programming Lab III (R-Programming)	MDM	-	-	-	-	-	25	25	50
EC 393	Project A (Literature Survey & Problem Formulation)	Experiential Learning Courses	-	-	-	-	-	50	50	100
Total										**850**

T- Theory , L- Lab , P-Programming, C- Communication

Course Code	Department Level Optional Course (DLOC) II	Specializations
EC 311	Digital Signal Processing	Robotics
EC 312	Advanced Network Theory	System Security
EC 313	Mobile Computing	Cloud Computing
EC 314	Wireless Networks	IOT

Course Code	Department Level Optional Course (DLOC) III	Specializations
EC 315	Machine Learning	AIML
EC 316	Big Data Analytics	Data Analytics
EC 317	Parallel Computing Architecture	High Performance Computing
EC 318	Integrated Circuit Technology	VLSI Design

Sr #	IL Specializations as per NEP	SEM	Open Elective courses to be offered
1	Business and Entrepreneurship	SEM V	IPR and Patenting
		SEM VI	e- Commerce and e-Business
2	Bio Engineering	SEM V	Introduction to Bioengineering
		SEM VI	Medical Image Processing
3	Engineering Design	SEM V	Product Design
		SEM VI	Technologies for Rural Development
4	Art and Humanities	SEM V	Visual Art
		SEM VI	Economics
5	Applied Science	SEM V	Computational Physics
		SEM VI	GIS and Remote Sensing
6	Life Skills, Repair, Maintenance and Safety	SEM V	Vehicle Safety
		SEM VI	Maintenance of Electronics and Mechanical Equipment

Semester VII

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract/ Tuts	Theory	Pract/Tuts	Total
EC 401	Embedded Systems and Real Time Programming	PCC	T	3	2	3	1	4
EC 4xx	Department Level Optional Course IV	PEC	TL	3	2	3	1	4
EC 4xx	Department Level Optional Course V	PEC	TL	3	2	3	1	4
EC 410	Research Methodology	Experiential Learning Courses	T	4	-	4	-	4
EC 491	Project B	Experiential Learning Courses	LPC	-	8	-	4	4
Total				**12**	**14**	**12**	**7**	**20**

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/ Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
EC 401	Embedded Systems and Real Time Programming	PCC	40	40	40	60	2	25	25	150
EC 4xx	Department Level Optional Course IV	PEC	40	40	40	60	2	25	25	150
EC 4xx	Department Level Optional Course V	PEC	40	40	40	60	2	25	25	150
EC 410	Research Methodology	Experiential Learning Courses	40	40	40	60	2	-	-	100
EC 491	Project B	Experiential Learning Courses	-	-	-	-	-	50	100	150
Total										**700**

T- Theory , L- Lab , P-Programming, C- Communication

Course Code	Department Level Optional Course (DLOC) IV	Specializations
EC 402	Speech Processing	Robotics
EC 403	Cryptography and System Security	System Security
EC 404	Cloud and Distributed Computing	Cloud Computing
EC 405	Embedded System Design & Basics of IOT	IOT

Course Code	Department Level Optional Course (DLOC) V	Specializations
EC 406	Deep Learning	AIML
EC 407	Data Science	Data Analytics
EC 408	High Performance Computing	High Performance Computing
EC 409	Analog and Mixed Signal VLSI Design	VLSI Design

Semester VIII

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract	Theory	Pract	Total
EC 411	Software Testing & Quality Assurance	PCC	T	3	-	3	-	3
EC 4xx	Department Level Optional Course VI	PEC	TL	3	2	3	1	4
EC 416	Multidisciplinary Minor Course	MDM/ Open Elective (OE)	T	2	-	2	-	2
EC 492	Project C	Experiential Learning Courses	LPC	-	6	-	3	3
EC 493	Internship/ OJT	Experiential Learning Courses	LPC	-	16	-	8	8
Total				**8**	**24**	**8**	**12**	**20**

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract /Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
EC 411	Software Testing & Quality Assurance	PCC	40	40	40	60	2	-	-	100
EC 4xx	Department Level Optional Course VI	PEC	40	40	40	60	2	25	25	150
EC 416	Multidisciplinary Minor Course	MDM/ Open Elective (OE)	30	30	30	45	1	-	-	75
EC 492	Project C	Experiential Learning Courses	-	-	-	-	-	50	50	100
EC 493	Internship/ OJT	Experiential Learning Courses	-	-	-	-	-	100	100	200
Total										**625**

T- Theory , L- Lab , P-Programming, C- Communication

Course Code	Department Level Optional Course (DLOC) VI	Specializations
EC 412	Robotics & Industrial Applications	Robotics
EC 413	Cyber Security & Digital Forensic	System Security
EC 414	Blockchain Technology	Cloud Computing
EC 415	Internet of Everything	IOT