

Mahatma Education Society's

School of Engineering



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 2026-27

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

Second Year - Effective from Academic Year **2027-28**

Third Year - Effective from Academic Year **2028-29**

Fourth Year - Effective from Academic Year **2029-30**

as per Choice Based Credit and Grading System

Mahatma Education Society's

School 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 - Syllabus for Undergraduate Programme

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:

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet

identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for
i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

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 C_1 , C_2 , C_3 , C_4 and C_5 and learners grade points in these courses are G_1 , G_2 , G_3 , G_4 and G_5 respectively, then learners SGPI is equal to:

$$SGPI = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

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,

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

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. Entrepreneurship Development and Management
2. Business Management
3. Intellectual Property 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
15. Quantum Computing and Quantum Technologies

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 department level specialization, a minimum of three courses under that specialization has to be completed.

Preface by Board of Studies in Electronics & Computer Science

Dear Students and Teachers, we, the members of Board of Studies Electronics & Computer Science, are very happy to present the B.Tech Electronics & Computer Science syllabus effective from the Academic Year 2024-25 . We are sure you will find this syllabus interesting, challenging, and up to date to fulfill specific needs and expectations.

The Electronics and Computer Science discipline combines two important disciplines of engineering: Electronics and Computer Science. 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 Electronics & Computer Science. Its primary goal is to offer a contemporary and industry-centric education, preparing individuals to effectively meet the global demands of the field.

The syllabus is meticulously crafted to align with the vision and mission of the Electronics & Computer Science Department as well as the standards set by various accreditation agencies. It takes into account technological advancements, innovations, and industry requirements, ensuring that the curriculum remains up-to-date and relevant to the evolving landscape of the field.

The development of this syllabus involves a collaborative brainstorming session, which includes the participation of Heads of Department and senior faculty members from the Department of Electronics & Computer Science.

We express our sincere appreciation and gratitude to the faculty, students, industry experts, and all the stakeholders for their invaluable contributions towards the formulation of this syllabus. Their expertise, insights, and active involvement have been instrumental in shaping and refining the curriculum.

Board of Studies in Electronics & Computer Science

- | | |
|---|---|
| 1. Dr. Monika Bhagwat | Coordinator (Chairman) |
| 2. Dr. Uttam Kolekar | Vice Chancellor's Nominee |
| 3. Dr. Vaishali Ingle | Academic Council Nominee |
| 4. Dr. Shweta Chawhane | Academic Council Nominee |
| 5. Mr. Vijay Raut | Industry Representative |
| 6. Mr.Saurabh Bhopi | Alumnus Nominee |
| 7. Dr. Parikshi Sahatiya | Experts from outside the Autonomous College |
| 8. All faculty members of the Department. | |

Semester I

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned					
			Theory	Pract/ Tuts	Theor y	Pract /Tuts	Total			
MATH 101	Engineering Mathematics I	BSC	2	2	2	1	3			
PHY 101	Engineering Physics I	BSC	2	1	2	0.5	2.5			
CHEM 101	Engineering Chemistry I	BSC	2	1	2	0.5	2.5			
MECH 101	Engineering Mechanics and graphics-I	ESC	3	2	3	1	4			
CE 101	Programming with C	ESC	3	2	3	1	4			
HUM 102	Ancient Indian Engineering	HSSM (IKS)	1	2	1	1	2			
ENGG 101	Skill Enhancement Course I	VSEC	1	2	1	1	2			
ENGG 102	Co-curricular Course I	Liberal learning	-	4	-	2	2			
	IDC I	Liberal learning	2	-	-	-	Audit Non Credit			
Total			15	14	15	7	22			
Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract /Oral	Total
			Internal Assessment			End Sem Exam	Exam Dura tion (Hrs)			
			1	2	Avg					
MATH 101	Engineering Mathematics I	BSC	30	30	30	45	2	-	25	100
PHY 101	Engineering Physics I	BSC	30	30	30	45	2	-	25	100
CHEM 101	Engineering Chemistry I	BSC	30	30	30	45	2	-	25	100
MECH 103	Engineering Mechanics and Graphics	ESC	40	40	40	60	2	-	50	150
CE 101	Programming with C	ESC	40	40	40	60	2	-	50	150
ENGG 104	Skill Enhancement Course I	VSEC	-	-	-	-	-	-	50	50
HUM 103	Ancient Indian Engineering	HSSM(IKS)	-	-	-	-	-	-	50	50
ENGG 106	Co-curricular Course I	Liberal learning	-	-	-	-	-	-	50	50
	IDC I	Liberal learning							50	-
Total										750

Semester II

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned					
			Theory	Pract /Tuts	Theory	Pract/ Tuts	Total			
MATH 105	Applied Mathematics for ECS	BSC	3	-	3	-	3			
PHY 104	Semiconductor Physics	BSC	2	1	2	0.5	2.5			
CHEM 102	Environmental Chemistry	BSC	2	1	2	0.5	2.5			
ENGG 103	Basic Electrical Engineering	ESC	3	2	3	1	4			
ENGG 108	Digital Logic Circuits	PCC	3	2	3	1	4			
COMM 104	Applied Critical Thinking	HSSM	1	2	1	1	2			
ENGG 106	Skill Enhancement Course II (Hands on Skills II)	VSEC	-	2	-	1	1			
ENGG 108	Skill Enhancement Course III B	VSEC	-	2	-	1	1			
ENGG 107	Co-curricular Course II	Liberal Learning	-	4	-	2	2			
	IDC II	Liberal learning	2	-	-	-	Audit Non Credit			
Total			15	14	15	7	22			
Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/ Oral	Total
			Internal Assessment			End Sem Exam	Exam Durat ion (Hrs)			
			1	2	Avg					
MATH 105	Applied Mathematics for ECS	BSC	30	30	30	45	2	-	25	100
PHY 104	Semiconductor Physics	BSC	30	30	30	45	2	-	25	100
CHEM 102	Environmental Chemistry	BSC	30	30	30	45	2	-	25	100
ENGG 103	Basic Electrical Engineering	ESC	40	40	40	60	2	-	25	150
ENGG 108	Digital Logic Circuits	PCC	40	40	40	60	2	-	25	150
COMM 104	Applied Critical Thinking	HSSM	-	-	-	-	-	-	50	50
ENGG 106	Skill Enhancement Course II	VSEC	-	-	-	-	-	-	50	50
ENGG 108	Skill Enhancement Course III B		-	-	-	-	-	-	50	50
ENGG 107	Co-curricular Course II	Liberal Learning	-	-	-	-	-	-	50	50
	IDC II	Liberal learning							50	-
Total										800

Semester III

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned					
			Theory	Pract/ Tuts	Theo ry	Pract /Tuts	Total			
MATH 204	Mathematics for Electronics & Computer Science III	ESC	3	1	3	1	4			
ECS 202	Analog Electronics Circuits	PCC	3	-	3	-	3			
ECS 203	Data Structures and Analysis of Algorithms	PCC	3	2	3	1	4			
ECS 204	Microcontrollers and Applications	MDM	3	-	3	-	3			
ECS 205	Database Management System	PCC	3	2	3	1	4			
ECS 206	Analog Electronics and Microcontrollers Lab	PCC	-	2	-	1	1			
HUM 201	Human Values and Social Ethics/IDC III	VEC	2	-	2	-	2			
ECS 291	Programming Lab- JAVA	VSEC	1	2	1	1	2			
	IDC III	Liberal learning	2	-	-	-	Audit Non Credit			
			18	8	18	5	23			
Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract /Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
MATH 204	Mathematics for Electronics & Computer Science III	ESC	40	40	40	60	2	25	-	125
ECS 202	Analog Electronics Circuits	PCC	40	40	40	60	2	-	-	100
ECS 203	Data Structures and Analysis of Algorithms	PCC	40	40	40	60	2	25	25	150
ECS 204	Microcontrollers and Applications	MDM	40	40	40	60	2	-	-	100
ECS 205	Database Management System	PCC	40	40	40	60	2	25	25	150
ECS 206	Analog Electronics and Microcontrollers Lab	PCC	-	-	-	-	-	25	25	50
HUM 201	Human Values and Social Ethics/IDC III	HSSM	-	-	-	-	-	50	-	50
ECS 291	Programming Lab- JAVA	VEC	-	-	-	-	-	25	25	50
	IDC III	Liberal learning	-	-	-	-	-	-	50	-
										775

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

Semester IV

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned					
			Theory	Pract/ Tuts	Theory	Pract/ Tuts	Total			
MATH 205	Mathematics for Electronics & Computer Science IV	ESC	3	2	3	1	4			
ECS 210	Fundamentals of VLSI Design	PCC	3	2	3	1	4			
ECS 211	Computer Networks	PCC	3	2	3	1	4			
ECS 212	Computer Organization and Architecture	MDM	3	-	3	-	3			
ECS 213	System Software & Operating Systems	PCC	3	2	3	1	4			
ENG 201	Entrepreneurship/IDC IV	HSSM	2	-	2	-	2			
	IDC IV	Liberal learning	2	-	-	-	Audit Non Credit			
Total			17	8	17	4	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					
MATH 205	Mathematics for Electronics & Computer Science IV	ESC	40	40	40	60	2	25	-	125
ECS 210	Fundamentals of VLSI Design	PCC	40	40	40	60	2	25	25	150
ECS 211	Computer Networks	PCC	40	40	40	60	2	25	25	150
ECS 212	Computer Organization and Architecture	MDM	40	40	40	60	2	-	-	100
ECS 213	System Software & Operating Systems	PCC	40	40	40	60	2	25	25	150
ENG 201	Entrepreneurship	Skill courses	20	20	20	40	2	-	-	60
	IDC IV	Liberal learning	-	-	-	-	-	-	50	-
Total										735

Semester V

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned		
				Theory	Pract/ Tuts	Theory	Pract / Tuts	Total
ECS 301	AIML	PCC	TL	3	2	3	1	4
ECS 302	Signal Processing	PCC	TL	3	2	3	1	4
ECS 303	Instrumentation and Control System	PCC	T	3	-	3	-	3
ECS 304	Software Engineering	MDM	MDM	3	-	3	-	3
ECS 3xx	Department Level Optional Course I	PEC	TL	3	2	3	1	4
IL 3xx	Institute Level Optional Course I	Open Elective (OEC)	T	2	-	2	-	2
COMM 202	Communication Skills II	AEC	LC	1	2	1	1	2
ECS 391	Programming Lab-Web Programming	Skill Courses	LPC	-	2	-	1	1
	IDC V	Liberal learning		2				Audit Non Credit
Total				17	9	17	5	23

Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/ Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
ECS 301	AIML	PCC	40	40	40	60	2	25	25	150
ECS 302	Signal Processing	PCC	40	40	40	60	2	25	25	150
ECS 303	Instrumentation and Control System	MDM	40	40	40	60	2	-	-	100
ECS 304	Software Engineering	PEC	40	40	40	60	2	-	-	100
ECS 3xx	Department Level Optional Course I	Open Elective Courses (OEC)	40	40	40	60	2	25	25	150
IL 3xx	Institute Level Optional Course I	AEC	30	30	30	45	2	-	-	75
COMM 202	Communication Skills II	AEC	-	-	-	-	-	50	-	50
ECS 391	Programming Lab-Web Programming	Skill Courses	-	-	-	-	-	25	25	50
	IDC V	Liberal learning	-	-	-	-	-	-	50	-
Total										825

Course Code	Department Level Optional Course (DLOC) I	Specializations
ECS 307	Foundations of Robotics	Robotics
ECS 308	Advanced Database Management Systems and DWM	Data Analytics
ECS 309	Mobile & Distributed Computing	Cloud Computing
ECS 310	Integrated Circuit Technology	VLSI Design

Course Code	Institute Level Optional Course (ILOC) I	Specializations
ENGG 380	IPR and Patenting	IP Management and Digital Business
MGMT 380	E- Commerce and E-Business	Business Management
ENGG 381	Introduction to Bioengineering	Bio Engineering
ENGG 382	Biomedical Instrumentation	Bio Instrumentation
DES 380	Design of Experiments	Engineering Design
DES 381	Design for Sustainability	Sustainable Technologies
ECON 380	Political Science	Contemporary Studies
VART 380	Visual Arts	Art and Journalism
PHY 380	Modern Day Sensor Physics	Applied Science
ENGG 383	Energy Audit and Management	Green Technologies
ENGG 384	Maintenance of Electronics Equipment	Maintenance Engineering
HMC 380	Cooking and Nutrition	Life Skills
EVS 380	Environmental Management	Environment
ENGG 385	Vehicle Safety	Safety
ENGG 394	Quantum Computing and Technologies - Part 1	Quantum Computing and Technologies

Semester VI

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned					
				Theory	Pract/ Tuts	Theory	Pract/ Tuts	Total			
ECS 315	Deep Learning	PCC	TLP	3	2	3	1	4			
ECS 316	Software Testing & Quality Assurance	MDM	T	3	-	3	-	3			
ECS 3xx	Department Level Optional Course II	PEC	TL	3	2	3	1	4			
ECS 3xx	Department Level Optional Course III	PEC	TL	3	2	3	1	4			
IL 3xx	Institute Level Optional Course II	Open Elective (OE)	T	2	-	2	-	2			
MGMT 290	Personal Finance Management	HSSM	T	2	-	2	-	2			
ECS 393	Data Analytics Lab	VSEC	L	-	2	-	1	1			
ECS 394	Project A	CEP/Field Project	LPC	-	4	-	2	2			
	IDC VI	Liberal learning		2	-	-	-	Audit Non Credit			
Total				17	10	17	5	22			
Course Code	Course Name	Category	Examination Scheme								
			Theory				End Sem Exam	Exam Duration (Hrs)	Term Work	Pract/ Oral	Total
			Internal Assessment								
			1	2	Avg						
ECS 315	Deep Learning	PCC	40	40	40	60	2	25	25	150	
ECS 316	Software Testing & Quality Assurance	MDM	40	40	40	60	2	-	-	100	
ECS 3xx	Department Level Optional Course II	PEC	40	40	40	60	2	25	25	150	
ECS 3xx	Department Level Optional Course III	PEC	40	40	40	60	2	25	25	150	
IL 3xx	Institute Level Optional Course II	Open Elective Courses(OEC)	30	30	30	45	2	-	-	75	
MGMT 290	Personal Finance Management	HSSM	30	30	30	45	2	-	-	75	
ECS 393	Data Analytics Lab	VSEC						25	25	50	
ECS 394	Project A	CEP/Field Project	-	-	-	-	-	25	25	50	
	IDC VI	Liberal learning	-	-	-	-	-	-	50	-	
Total										800	

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

Course Code	Department Level Optional Course (DLOC) II	Specializations
ECS 320	Natural Language Processing	AIML
ECS 321	Cryptography and System Security	System Security
ECS 322	Advanced Operating System	High Performance Computing
ECS 323	Embedded System Design and Basics of IOT	IOT

Course Code	Department Level Optional Course (DLOC) III	Specializations
ECS 324	Advanced Robotics	Robotics
ECS 325	Big Data Analytics	Data Analytics
ECS 326	Cloud Computing	Cloud Computing
ECS 327	Advanced VLSI Design	VLSI Design

Course Code	Institute Level Optional Course (ILOC) II	Specializations
MKT 380	Digital Business Management and Digital Marketing	IP Management and Digital Business
ENGG 386	Business Analytics	Business Management
ENGG 387	Bio Mechanics	Bio Engineering
ENGG 388	Medical Image Processing	Bio Instrumentation
DES 382	Product Design	Engineering Design
DES 383	Technologies for Rural Development	Sustainable Technologies
ECON 381	Economics	Contemporary Studies
MMC 380	Journalism, Media and Communication studies	Art and Journalism
ENGG 389	Operation Research	Applied Science
ENGG 390	Climate Informatics	Green Technologies
ENGG 391	Maintenance of Mechanical Equipment	Maintenance Engineering
PE 380	Physical Education	Life Skills
ENGG 392	Industrial Regulations and Laws	Environment
ENGG 393	Industrial and high voltage Safety	Safety
ENGG 395	Quantum Computing and Technologies - Part 2	Quantum Computing and Technologies

Semester VII

Course Code	Course Name	Category	Course Component	Teaching Scheme (Contact Hours)		Credits Assigned				
				Theory	Pract/ Tuts	Theory	Pract/Tuts	Total		
ECS 401	Image Processing and Machine Vision	PCC	T	3	2	3	1	4		
ECS 4xx	Department Level Optional Course IV	PEC	TL	3	2	3	1	4		
ECS 4xx	Department Level Optional Course V	PEC	TL	3	2	3	1	4		
ECS 491	MDM Project	MDM	T	-	4	-	2	2		
ECS 492	Project B	Experiential Learning Courses	LPC	-	8	-	4	4		
Total				9	18	9	9	18		
Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Pract/ Oral	Total
			Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
			1	2	Avg					
ECS 401	Image Processing & Machine Vision	PCC	40	40	40	60	2	25	25	150
ECS 4xx	Department Level Optional Course IV	PEC	40	40	40	60	2	25	25	150
ECS 4xx	Department Level Optional Course V	PEC	40	40	40	60	2	25	25	150
ECS 491	MDM Project	MDM	-	-	-	-	-	25	25	50
ECS 492	Project B	Experiential Learning Courses	-	-	-	-	-	50	100	150
Total										650

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

Course Code	Department Level Optional Course (DLOC) IV	Specializations
ECS 405	Generative AI & Large Language Models	AIML
ECS 406	Blockchain & Security	System Security
ECS 407	Parallel Computing Architecture	High Performance Computing
ECS 408	Wireless Networks	IOT

Course Code	Department Level Optional Course (DLOC) V	Specializations
ECS 409	Intelligent Robotics	Robotics
ECS 410	Data Science	Data Analytics
ECS 411	Edge & Fog Computing	Cloud Computing
ECS 412	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		
ENGG 401	Research Methodology	Experiential Learning Courses	T	2	-	2	-	2		
ECS 4xx	Department Level Optional Course VI	PEC	TL	3	2	3	1	4		
ECS 493	Project C	Field project	LPC	-	4	-	2	2		
ENGG 495	Internship	Internship/ OJT	LPC	-	16	-	8	8		
Total				5	22	5	11	16		
Course Code	Course Name	Category	Examination Scheme							
			Theory					Term Work	Prac t/Or al	Total
			Internal Assessment			End Sem Exam	Exam Durati on (Hrs)			
			1	2	Avg					
ENGG 401	Research Methodology	Experiential Learning Courses	30	30	30	45	2	-	-	75
EC 4xx	Department Level Optional Course VI	PEC	40	40	40	60	2	25	25	150
ECS 493	Project C	Field project	-	-	-	-	-	50	50	100
ENGG 495	Internship	Internship/ OJT	-	-	-	-	-	100	100	200
Total										525

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

Course Code	Department Level Optional Course (DLOC) VI	Specializations
ECS 415	Reinforcement Learning and Explainable AI (XAI)	AIML
ECS 416	Cyber Security and Digital Forensics	System Security
ECS 417	High Performance Computing	High Performance Computing
ECS 418	Internet of Everything	IOT