PERIYAR UNIVERSITY

PERIYAR PALKALAI
NAGAR SALEM-636011

DEGREE OF BACHELOR OF SCIENCE

Syllabus for

B.Sc., INTERNET OF THINGS

(SEMESTER PATTERN- CBCS)

(For Candidates admitted in the colleges affiliated to

Periyar University from 2026-2027 onwards)

1. INTRODUCTION

B.Sc. Internet of Things

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Learning Outcomes-based Curriculum Framework (LOCF) which makes it student-centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve. LOCF also aims at ensuring uniform education standard and content delivery across the state which will help the students to ensure similar quality of education irrespective of the institute and location.

Computer Science is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. throughout the world in last couple of decades and it has carved out a space for itself like any other disciplines of basic science and engineering. Computer science is a discipline that spans theory and practice and it requires thinking both in abstract terms and in concrete terms. Nowadays, practically everyone is a computer user, and many people are even computer programmers. Computer Science can be seen on a higher level, as a science of problem solving and problem solving requires precision, creativity, and careful reasoning. The ever-evolving discipline of computer science also has strong connections to other disciplines. Many problems in science, engineering, health care, business, and other areas can be solved effectively with computers, but finding a solution requires both computer science expertise and knowledge of the particular application domain. Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Computational

Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialty area focuses on specific challenges. Computer Science is practiced by mathematicians, scientists and engineers. Mathematics, the origins of Computer Science, provides reason and logic. Science provides the methodology for learning and refinement. Engineering provides the techniques for building hardware and software.

The Students completing this programme will be able to present Software application clearly and precisely, make abstract ideas precise by formulating them in the Computer languages. Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in software industry, banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASED REGULATIONS FOR UNDER GRADUATE PROGRAMME	
Programme:	**B.Sc., Computer Science (Internet of Things)**
Programme Code:	
Duration:	**3 years [UG]**
Programme Outcomes:	**PO1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study. **PO2: Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups. **PO3: Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyses and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

	PO4: Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations. **PO5: Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints. **PO6: Research-related skills**: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyses, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation. **PO7: Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team **PO8: Scientific reasoning**: Ability to analyses, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective. **PO9: Reflective thinking**: Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society. **PO10: Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data. **PO11: Self-directed learning**: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion. **PO12: Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups. **PO13: Moral and ethical awareness/reasoning**: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable

	of demon starting the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work. **PO14: Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way. **PO15: Lifelong learning:** Ability to acquire knowledge and skills, including "learning how to learn", that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskill.

Highlights of the Revamped Curriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application-oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics based problem solving skills are included as mandatory components in the _Training for Competitive Examinations course at the final semester, a first of its kind.

- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience, that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

DURATION OF THE PROGRAMME

The programme shall extend over a period of three years comprising six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examination shall be conducted at the end of every semester for the respective subjects.

COURSE OF STUDY

The programme of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time. The syllabus for various subjects shall be clearly demarcated into five units in each subject. Part -I, Part-II, Part- III and Part - IV subjects are prescribed in the scheme of examination. The Extension Activities are a

must for each student to take part at least in any one of the activities such as NSS, YRC, SPORTS and RRC for the fulfillment of the degree.

EXAMINATIONS

The theory examination shall be three-hour duration for each paper at the end of every semester. The candidate failing in any subject(s) will be permitted to appear in the subsequent examination. The practical examinations for core subjects and SEC should be conducted at the end of every semester.

Submission of record note books for practical examinations: Candidates appearing for practical examinations should submit bonafide Record note books prescribed for practical examinations, Otherwise the candidates will not be permitted to appear for the practical examinations. However, in genuine cases of the students who could not submit the record note books, they may be permitted to appear for the practical examinations, provided the concerned Head of the Department certify that the candidate has performed the experiments prescribed for the course. For such candidates zero (0) marks will be awarded for record note books.

REVISION OF REGULATIONS AND CURRICULUM

The University may revise/amend/ change the Regulations and Scheme of Examinations, as and when found necessary.

COMMENCEMENT OF THIS REGULATION:

These regulations shall take effect from the academic year 2026-2027, i.e., for students who are to be admitted to the first year of the programme during the academic year 2026-2027 and thereafter.

PATTERN OF QUESTION PAPER

Time: Three Hours Maximum: 75 marks

Part A- (15X1 = 15marks)
Answer all questions
(a),(b),(c),(d) Multiple Choice

Part B-(2X5 = 10 marks)
Answer any Two questions out of five
(One question from each unit)

Part C- (5X10 = 50 marks)
Answer ALL questions
Either (or) Type Five questions
(One question from each unit)

INTERNAL MARKS AND EXTERNAL MARKS

	Internal Marks	**External Marks**
Theory	25	75
Practical	40	60
Project	25	75
Internship/Health& Wellness	Commended/Highly Commended	

(a) Practical-External marks distribution (Total Marks: 60)

For each practical question the marks should be awarded as follows (External)

i) Algorithm/flowchart - 20%

ii) Writing the program in the main answer book - 30%

iii) Test and debug the program - 30%

iv) Printing the correct output - 20%

(Marks may be proportionately reduced for the errors committed in each of the above)

Practical Question Paper Pattern

Student should attend two questions (either / or patter

COURSE OF STUDY AND SCHEME OF EXAMINATION

SNO	Sem	Paper code	Part	Course Group	Paper Type	Subject Title	Hours Week	Exam Hours	Internal Marks	External Marks	Total Marks	Credit	Page No.
1	I		I	Foundation	Theory	Language – Tamil	6	3	25	75	100	3	
2			II	Foundation	Theory	Language – English	6	3	25	75	100	3	
3			III	Core	Theory	Problem Solving Using C	6	3	25	75	100	5	9
4			III	Core	Practical	Practical : Programming in C Lab	3	3	40	60	100	5	12
5			III	Allied	Theory	Maths/Physics/Electronics/Statistics	6	3	25	75	100	4	
6			IV	NME-I	Theory		2	3	25	75	100	2	
7			IV	Value Added	Theory	Value Education	1	3	25	75	100	1	
Total					7		30					23	
8	II		I	Foundation	Theory	Language – Tamil	6	3	25	75	100	3	
9			II	Foundation	Theory	Language – English	6	3	25	75	100	3	
10			III	Core	Theory	Principles of Electronics Circuit and Design	5	3	25	75	100	5	14
11			III	Core	Practical	Practical: Circuit Design Lab	3	3	40	60	100	5	17
12			III	Allied	Theory	Maths/Physics/Electronics/Statistics	3	3	25	75	100	2	
13			III	Allied	Practical	Maths/Physics/Electronics/Statistics	2	3	40	60	100	2	
14			IV	NME-II	Theory		2	3	25	75	100	2	
15			IV	Value Added	Theory	Disaster Management	1	3	25	75	100	1	
16				Naan Mudhalvan	NMSD		2		25	75	100	2	
Total					7+1		30					23+2	

PROBLEM SOLVING USING C	
Learning Objectives	
LO1	Recall the fundamentals of problem-solving techniques, Data types, input/output, Decision making and branching statements.
LO2	Apply input/output operations, operators, and expressions in C.
LO3	Identify the functions and recursion for modular programming.
LO4	Implementation of arrays, strings, structures, unions, and user-defined data types.
LO5	Analyze the concept of pointers and file handling techniques.

CONTENT

UNIT I: Introduction: Steps Involved in Problem Solving Using Computers**- Algorithms:** Characteristics of Algorithms- Examples of Algorithms - Advantages and Disadvantages of Algorithms. **Flow Charts**: Symbols Used in Flow Charts - Advantages and Disadvantages of Flow Charts. **Pseudocode**: Sequence, Selection and Iteration - Examples of Pseudocodes - Advantages and Disadvantages of Pseudocodes - **Evolution of Programming Languages:** Introduction - Classification of Programming Languages - Language Translator.

UNIT II: Overview of C Language : Introduction - Characteristics of C Language - Components of a C Program - Input and Output in C - Execution of a C Program - Errors - C Language Primitives - Keywords and Identifiers - Constants - Variables - Data Types. **Input-Output Operations:** Introduction - getchar() and putchar() Functions- scanf() and printf() Functions - Formatting of Outputs - **Operators and Expressions.**

UNIT III: Decision-Making and Branching (Selection): Introduction - Simple-if Statement - if-else Statement - else-if Ladder - Switch Statement - goto Statement. **Looping Statements in C:** Introduction - While Loop - for Loop - do-while Loop - Jumps in Loops - Nesting of Loops- **Functions:** Classification of Functions - Nesting of Functions - Recursion.

UNIT IV: Arrays: Introduction - Definition of an Array - One-dimensional Arrays - Multidimensional Arrays - **Strings:** String I/O - Initialization of Arrays of char Type - String Manipulations - **Structures and Unions:** Introduction - Definition of Structure Template - Declaration of Structure Variables - Initialization of Structure Variables - Operations on Structures - Arrays and Structures - Structure within Structure - Structures and Functions - Union - Enumerated Data Type - typedef.

UNIT V: Pointers: Introduction - Pointer Operators &, * - Pointer Arithmetic - Pointers and Arrays - Pointers and Strings - Dynamic Memory Allocation. **File Handling in C:** Introduction - Operations on

Files - Opening and Closing of Files - File I/O Functions - Random Accessing of Files -fseek(), ftell(), rewind() - Command Line Arguments.	
Course Outcome	
CO1	Explain problem-solving techniques using algorithms, flowcharts, and pseudocode.
CO2	Develop C programs using data types, operators, expressions, and input/output statements.
CO3	Apply decision-making, looping, functions, and recursion concepts in C programming.
CO4	Analyze and implement programs using arrays, strings, structures, and unions.
CO5	Design C applications using pointers, dynamic memory allocation, and file handling techniques.
Learning Resources	
Text Books	1. "Problem Solving With C" Somashekara, M. T.,Guru, D. S., Manjunatha, K.S. PHI Learning Pvt. Ltd.,.
Reference Books	1. "Programming in ANSI C", E. Balagurusamy Tata McGraw Hall, New Delhi, 5th Edition 2. Schaum's Outlines, "Programming with C", Byron S Gottfried, 2nd Edition. 3. "Let Us C".Yashavant Kanetkar.
Website/ Link	http://www.learn-c.org/ http://crasseux.com/books/ctutorial/

Mapping with Programme Outcomes

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	1	1	3	2
CO2	2	2	1	2	1
CO3	3	2	2	2	2
CO4	3	2	3	3	2
CO5	3	3	3	2	3
Weightage of course contributed to each PSO	13	10	10	12	10

S-Strong-3 M-Medium-2 L-Low-1

PROGRAMMING IN C LAB	
Learning Objectives	
LO1	Understanding the statement structure and apply simple problems
LO2	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.
LO3	Understand the concept using if statements and loops
LO4	Understand the concept of Arrays and Functions
LO5	To understand the concept of implementing pointers and files

LAB EXERCISES

1. Write a C program to find the total and average percentage obtained by the students for 5 subjects.
2. Write a C program to check whether a given character is Vowel or not using Switch-Case statement.
3. Write a C program to find the sum of n numbers using do-while statement.
4. Write a C program to find the Factorial of a given number using Function.
5. Write a C program to swap two numbers using call by values and call by reference.
6. Write a C program to smallest and largest element in an array.
7. Write a C program to perform Matrix multiplication.
8. Write a C program to reverse a string without using string library function
9. Write a C program to find the sum of an integer array using Pointers.
10. Write a C program to copy the content of one file into another.

Course Outcomes	
CO1	Recognize the Basic Terminologies of C Programming
CO2	Understanding the statement structure and apply simple problems

CO3	Understand and apply the pre-defined functions and user defined functions and then apply in simple problems
CO4	Demonstrate the operation of Structures and Unions.
CO5	Recognize the operation of Pointers and Files

Mapping with Programme Outcomes

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	3	3
CO2	3	2	3	2	2
CO3	3	3	2	2	2
CO4	3	2	3	3	2
CO5	3	3	2	2	3
Weightage of course contributed to each PSO	15	13	12	12	12

S-Strong-3 M-Medium-2 L-Low-1

PRINCIPLES OF ELECTRONIC CIRCUIT DESIGN	
Learning Objectives	
LO1	To enable the students to understand and gain the knowledge on Electronic Circuit Design Principles
LO2	To acquaint the students with construction, theory and characteristics of the various kinds of electronic devices
LO3	Understanding of Amplifiers
LO4	Implementation of Types of Oscillators.
LO5	Analyze the Linear ICs.

CONTENT

UNIT I: Fundamentals of Electronics: AC and DC Fundamentals- Resistors – Capacitors – Inductors – Series and parallel connections – Ohms Law – KCL- KVL – Super position theorem - Maximum power transfer theorem. Semiconductors- Types - Energy band Structure- Working and characteristics of PN Junction Diode- BJT-JFET- MOSFET- LED – LDR- Solar Cell- Photo Diode

UNIT II : Rectifiers and power supply: Rectifier – Half wave rectifier– full wave rectifier – bridge rectifier Compression - Filters – Capacitor Filter, Inductor Filter, L section and π section filters – Regulators –78XX and 79XX IC regulators – Single and Dual regulated power supply design using IC regulators.

UNIT III: Amplifier: Definition – feedbacks – effect of negative feedback in amplifiers –Common emitter amplifier – Multistage amplifiers – RC Coupled amplifiers – Transformer coupled amplifier – Direct coupled amplifier – frequency response.

UNIT IV: Oscillator and Wave Shaping circuits: Condition for Oscillation – Barkhausen criterion – Types of Oscillators – Hartley oscillator – Colpitt's oscillator – Crystal oscillator - RC phase shift oscillator – Astable Multivibrator – Mono stable Multivibrator – Bistable multivibrator – Schimit trigger– UJT Relaxation oscillator - Clipesr-Clampers**.**

UNIT V: Linear ICs: OpAmp: Ideal OpAmp – OpAmp Stages - OpAmp parameters – inverting and non-inverting amplifiers – Adder and Subtractor – Multiplier and Divider – Differentiator – integrator - V to I and I to V converter – sample and hold circuit – Instrumentation amplifier.**IC55 5 Timer:** Pin details of IC 555 – Block Diagram – Astable multivibrator -Mono stable multivibrator – Bistable Multivibrator.	
Course Outcome	
CO1	Recognize the fundamental concepts of solid state devices
CO2	Understand the types and characteristics of various rectifiers, filters and regulators.
CO3	Apply the operation of the devices on various amplifier designs
CO4	Illustrate the functionality of different kinds of oscillator and wave shaping circuits
CO5	Analyze the characteristics of the Linear IC's in different aspects.
Learning Resources	
Text Books	1. V.K. Metha, Rohit Metha - Principles of Electronics-S.Chand 12th edition 2. R.S Sedha –A Textbook of Applied Electronics - Revised Edition – 2008. 3. A. Sudhakar, Shyammohan S. Palli -Circuits and Networks: Analysis and Synthesis
Reference Books	1. S. Salivahanan, N. SureshKumar-Electronic Devices and Circuits –4th Edi -2017 2. Isaak D. Mayergoyz, W. Lawson - Basic Electric Circuit Theory
Website/ Link	https://www.edx.org/course/principle-of-semiconductor-devices-part-i-semicond https://www.edx.org/course/principles-of-electronic-biosensors

Mapping with Programme Outcomes

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	2	2	3	2
CO 2	3	3	2	3	2
CO 3	3	3	3	3	2
CO 4	3	3	2	3	2
CO 5	3	3	2	3	2
Weightage of course contributed to each PSO	15	14	11	15	10

S-Strong-3 M-Medium-2 L-Low-1

CIRCUIT DESIGN LAB	
Learning Objectives	
LO1	To enable the students to understand and gain the knowledge on Electronic Circuit Design Principles
LO2	To acquaint the students with construction, theory and characteristics of the various kinds of electronic Devices

LAB EXERCISES

1. Data acquisition using Multimeter and oscillographic recorder
2. Connect an LED to GPIO pin 25 and control it through the command line.
3. Connect an LED to GPIO pin 24 and a Switch to GPIO 25 and control the LED with the switch.
4. The state of LED should toggle with every press of the switch Use DHT11 temperature sensor and print the temperature and humidity of the room with an interval of 15 seconds
5. Use joystick and display the direction on the screen
6. Use Light Dependent Resistor (LDR) and control an LED that should switch-on/off depending on the light.
7. Create a traffic light signal with three colored lights (Red, Orange and Green) with a duty cycle of 5-2-10 seconds.
8. Switch on and switch of a DC motor based on the position of a switch.
9. Convert an analog voltage to digital value and show it on the screen.
10. Create a door lock application using a reed switch and magnet and give a beep when the door is opened.
11. Control a 230V device (Bulb) with Raspberry Pi using a relay.
12. Control a 230V device using a threshold temperature, using a temperature sensor.
13. Create an application that has three LEDs (Red, Green and white). The LEDs should follow the cycle (All Off, Red On, Green On, White On) for each clap (use sound sensor).
14. Create a web application for the above applications wherever possible with suitable modifications to get input and to send output.

Course Outcomes	
CO1	Recognize the fundamental concepts of solid state devices
CO2	Understand the types and characteristics of various rectifiers, filters and regulators.
CO3	Apply the operation of the devices on various amplifier designs
CO4	Illustrate the functionality of different kinds of oscillator and wave shaping circuits
CO5	Analyze the characteristics of the Linear IC's in different aspects.

Mapping with Programme Outcomes

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	3	2
CO2	3	3	2	3	2
CO3	3	3	3	3	2
CO4	3	3	2	3	2
CO5	3	3	2	3	3
Weightage of course contributed to each PSO	15	14	11	15	11

S-Strong-3 M-Medium-2 L-Low-1