B.Tech Information Technology Curriculum

A comprehensive semester-wise subject guide for B.Tech Information Technology programme at Er. Perumal Manimekalai College of Engineering, following Academic Regulations 2023 (R23). This curriculum spans eight semesters, designed to build strong foundations in mathematics, programming, and advanced IT concepts whilst preparing students for industry challenges.

Semester I - Foundation Building

Core Mathematics & Sciences

- Matrices and Calculus
- Engineering Physics
- Engineering Chemistry
- Physics and Chemistry Laboratory

Language & Communication

- Professional English - I
- Professional English - I Lab
- Heritage of Tamils
- Wellness

Engineering Fundamentals

- Engineering Graphics
- Induction Programme (2 weeks)

The first semester establishes a solid foundation with 21 total credits, focusing on mathematical concepts, scientific principles, and communication skills essential for engineering studies. Students begin with an intensive induction programme before diving into core subjects.

Semester II - Programming Introduction

Technical Subjects

- Statistics and Numerical Methods
- Physics for Information Science
- Introduction to IT Essentials
- Basic Electrical & Electronics Engineering
- Problem Solving using Python Programming

Practical Components

- Python Programming Laboratory
- Civil and Mechanical Engineering Practices
- Electrical and Electronics Engineering Practices

This semester introduces programming fundamentals through Python, marking the beginning of the student's journey into software development. The curriculum balances theoretical knowledge with hands-on laboratory experience.

Semester II comprises 24 total credits, introducing students to programming concepts whilst maintaining focus on mathematical and scientific foundations.

Semester III - Core Computer Science

01

Mathematics for Computer Science

Advanced mathematical concepts specifically tailored for computing applications, building upon previous mathematical foundations.

02

Digital Logic and Microprocessor

Understanding digital systems, logic gates, and microprocessor architecture - fundamental to computer hardware comprehension.

03

Artificial Intelligence

Introduction to AI concepts, algorithms, and applications in modern computing systems.

04

Data Structures and Algorithms

Core programming concepts including arrays, linked lists, trees, and algorithmic problem-solving techniques.

05

Object Oriented Programming

Advanced programming paradigms focusing on encapsulation, inheritance, and polymorphism principles.

This semester marks a significant transition with 20 total credits, introducing core computer science concepts that form the backbone of IT education.

Semester IV - System Fundamentals

Environmental Sciences & Sustainability

Understanding environmental impact of technology and sustainable development practices in IT industry.

Computer Organization and Architecture

Deep dive into computer hardware, memory systems, and processor design principles.

Information Retrieval

Techniques for storing, searching, and retrieving information from large datasets and databases.

Operating Systems

Process management, memory allocation, file systems, and system security concepts.

Database Management Systems

Relational database design, SQL programming, and database administration principles.

Semester IV provides 20 total credits and includes the first phase of in-plant training, connecting theoretical knowledge with industry practices.

Semester V - Advanced Technologies

Core Professional Subjects

- Universal Human Values & Ethics
- TCP/IP Protocol Suite
- Software Engineering - Principles and Practices

Professional Electives (Choose 3)

Students select three professional electives based on their interests and career goals, allowing specialisation in specific IT domains.

Practical Components

- Socket Programming Laboratory
- Professional Development Laboratory-I

With 21 total credits, this semester balances core networking knowledge with elective specialisation and continued in-plant training.

This semester emphasises networking concepts and software engineering practices, preparing students for complex system development. The inclusion of ethics ensures responsible technology development.

Semester VI - Specialisation & Systems

Compiler Design

Understanding lexical analysis, parsing, code generation, and optimization techniques for programming language implementation.

Embedded Systems and IoT

Microcontroller programming, sensor integration, and Internet of Things applications in modern computing.

Entrepreneurship Development

Business skills, startup methodologies, and innovation management for technology entrepreneurs.

Professional Elective IV

Advanced specialisation subject chosen based on student interests and industry requirements.

Open Elective II

Interdisciplinary subject allowing students to explore areas beyond core IT curriculum.

Technical Skill Development-I

Industry-relevant skills training to enhance employability and practical competencies.

Semester VI offers 20 total credits with focus on advanced system design and entrepreneurial skills development.

Semester VII - Security & Mobile Development

Cryptography and Cyber Security

Advanced security algorithms, encryption techniques, and cybercrime prevention strategies for secure system development.

Mobile Application Development

Android development, user interface design, and mobile app architecture using modern development frameworks.
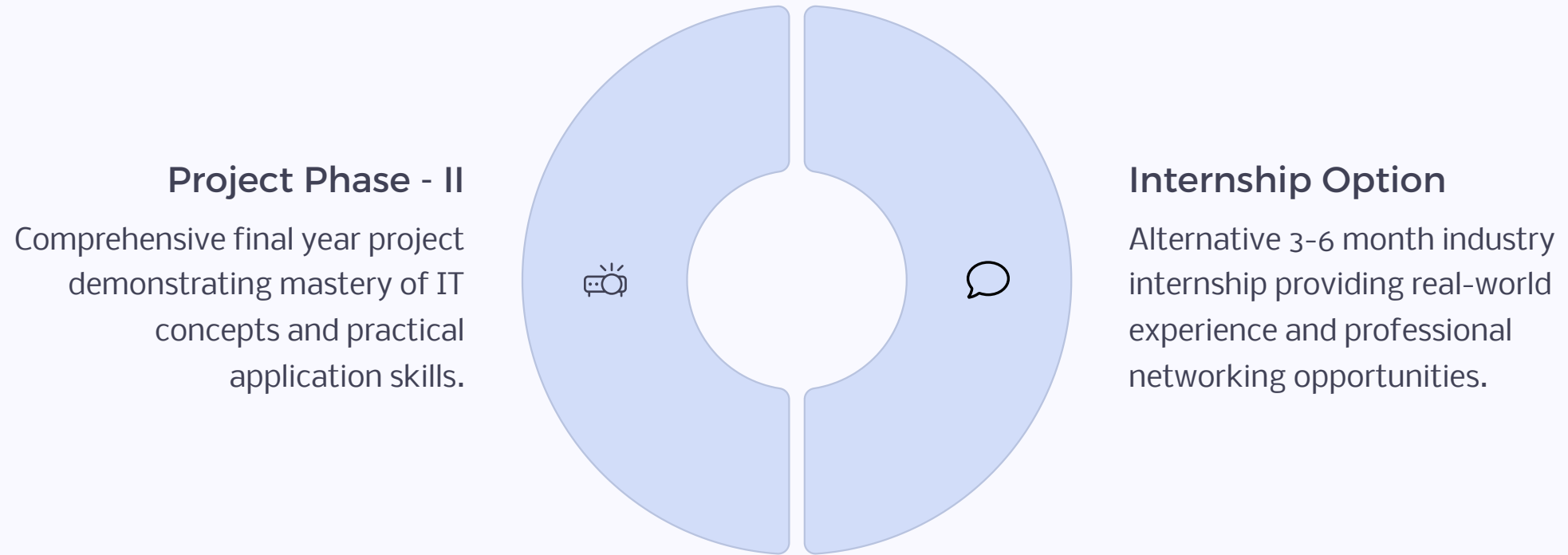
Electives & Projects

- Professional Electives V & VI
- Open Electives III & IV
- Project Phase - I
- Technical Skill Development-II

The seventh semester combines advanced technical subjects with project work, allowing students to apply their knowledge in real-world scenarios whilst developing specialised skills.

This intensive semester provides 27 total credits, the highest in the programme, reflecting the advanced nature of the subjects and project requirements.

Semester VIII - Capstone Project

Project Phase - II

Comprehensive final year project demonstrating mastery of IT concepts and practical application skills.

Internship Option

Alternative 3-6 month industry internship providing real-world experience and professional networking opportunities.

The final semester is entirely dedicated to project work or internship, allowing students to synthesise their learning through practical application. This capstone experience prepares graduates for immediate industry contribution or advanced studies.

Semester VIII awards 10 total credits through intensive project work, culminating the four-year academic journey with practical demonstration of acquired competencies.

Programme Summary & Career Readiness

163
Total Credits

Complete programme requirement for B.Tech Information Technology degree

8
Semesters

Structured learning progression over four academic years

18
Professional Electives

Specialisation opportunities across six elective subjects

4
Weeks Training

Mandatory in-plant training connecting theory with industry practice

Programme Highlights

- Comprehensive foundation in mathematics and sciences
- Progressive skill development from basic programming to advanced systems
- Industry-relevant training and internship opportunities
- Emphasis on emerging technologies like AI, IoT, and cybersecurity
- Professional development and entrepreneurship skills
- Capstone project demonstrating practical competency

This curriculum prepares graduates for diverse career paths in software development, system administration, cybersecurity, mobile app development, and technology entrepreneurship. The balanced approach of theoretical knowledge and practical skills ensures industry readiness.

The B.Tech Information Technology programme at Er. Perumal Manimekalai College of Engineering provides a comprehensive education that balances theoretical foundations with practical applications, preparing students for successful careers in the rapidly evolving technology sector.