



**ST. THOMAS COLLEGE (AUTONOMOUS)**  
THRISSUR, KERALA - 680 001

College with Potential for Excellence  
NIRF INDIA Ranking 2021 : 64<sup>th</sup>

[www.stthomas.ac.in](http://www.stthomas.ac.in)

**PROGRAMME OUTCOMES**  
**PROGRAMME SPECIFIC OUTCOMES**  
**COURSE OUTCOMES**

**B.Sc Electronics**

## **UNDER GRADUATE PROGRAM OUTCOMES:**

At the end of Under Graduate Program at St. Thomas College (Autonomous), a student will have obtained:

PO1	Critical Thinking: Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives
PO2	Effective Communication: Ability to speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology
PO3	Effective Citizenship: Ability to demonstrate empathetic social concern and equity-centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering
PO4	Environment and Sustainability: Ability to understand the issues of environmental contexts and sustainable development
PO5	Ethical Living: Ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them
PO6	Social Interaction: Ability to elicit views of others, mediate disagreements and help reach conclusions in group settings
PO7	Problem Solving and Analytical Skills: Ability to think rationally, analyze situations and solve problems adequately

## **Program Specific Outcomes:**

At the end of B.Sc Electronics at St. Thomas College (Autonomous), Thrissur, a student will have developed:

PSO1	Understand the principles of electronic devices, digital and analog circuits, microwave and communication systems.
PSO2	Understand the processes in DSP and VLSI Technology.
PSO3	Understand various methods in control systems, network theory and electromagnetic theory.
PSO4	Develop the skills in computer programming, computer networking and design of embedded systems.

## Course Outcomes:

### **B.Sc. Electronics**

#### **ELE1B01- BASIC ELECTRONICS AND NETWORK THEOREMS**

At the end of this course, a student will have developed ability to:

CO1	Understand the principles of passive electronic devices
CO2	Understand the structure and principles of semiconductor devices
CO3	Illustrate series and parallel resistive circuits
CO4	Understand different network theorems

## **B.Sc. Electronics**

### **ELE2B03- BASIC ELECTRONICS AND NETWORK THEOREMS LAB**

At the end of this course, a student will have developed ability to:

CO1	Familiarize various electronic components, measuring and testing instruments.
CO2	Interpret the voltage, current and resistance of various resistor networks.
CO3	Analyse Kirchoffs laws
CO4	Understand the characteristics of various active components.

## **B.Sc. Electronics**

### **ELE2B02- ELECTRONIC CIRCUITS**

At the end of this course, a student will have developed ability to:

CO1	Understand rectifier, filter and voltage regulator circuits.
CO2	Distinguish various wave shaping circuits
CO3	Determine transistor biasing methods and various amplifier circuits.
CO4	Understand the concepts of various oscillator circuits.

## **B.Sc. Electronics**

### **ELE2B04- ELECTRONIC CIRCUITS LAB**

At the end of this course, a student will have developed ability to:

CO1	Understand various rectifier and filter circuits.
CO2	Familiarize various wave shaping circuits.
CO3	Understand the working of voltage regulator.
CO4	Apply transistor biasing methods in amplifier circuits.
CO5	Identify various oscillator circuits

## **B.Sc. Electronics**

### **A11- Python Programming**

At the end of this course, a student will have developed ability to:

CO1	Understand basic constructs in python programming.
CO2	Apply methods to design and program Python applications
CO3	Understand the concepts of functions and represent Compound data using Lists, Tuples and Dictionaries
CO4	Design real life situational problems and think creatively about solutions of them.
CO5	Understand the concepts of indexing and slicing to access data in Python programs
CO6	Identify various application areas of Python



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**A12- SENSORS AND TRANSDUCERS (Basic principle, working and applications only expected)**

At the end of this course, a student will have developed ability to:

CO1	Understand transducers and its characteristics.
CO2	Comprehend the principles of resistive, inductive and capacitive transducers and its types
CO3	Explain the concepts of Thermal sensors and its types
CO4	Classify Pressure Transducers and Level Transducers
CO5	Explain the concepts of Flow Transducers and Bernoulli's principle
CO6	Comprehend the principles of Radiation Sensors and its different types
CO7	Understand Sound Transducers and Hall Effect Transducers

## **B.Sc. Electronics**

### **ELE3B05- DIGITAL ELECTRONICS**

At the end of this course, a student will have developed ability to:

CO1	Understand different type of digital codes and number systems
CO2	Identify digital IC's in the 74XX Series in detail.
CO3	Compare different types of logic families.
CO4	Analyze different combinational circuits and working.
CO5	Design various sequential circuits.
CO6	Interpret different ADC, DAC circuits

## **B.Sc. Electronics**

### **ELE4B07- DIGITAL ELECTRONICS LAB**

At the end of this course, a student will have developed ability to:

CO1	Interpret different logic gates
CO2	Understand universal property of NAND and NOR gates
CO3	Design various combinational circuits
CO4	Design and implement different sequential circuits

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### **ELE4B09- SKILL DEVELOPMENT LAB**

At the end of this course, a student will have developed ability to:

CO1	Understand the basics of PCB designing
CO2	Analyze different circuits
CO3	Design circuits using PCB fabrication techniques

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### **A13- Data Communication and Optical Fibers**

At the end of this course, a student will have developed ability to:

CO1	Introduce basic concepts of data communication.
CO2	Familiarize multiplexing and its applications.
CO3	Recognize data link control and protocols.
CO4	Identify LANs, viz., Ethernet, token ring, token bus, FDDI.
CO5	Compare switching techniques.
CO6	Introduce optical fiber communication and its applications.
CO7	Familiarize optical sources and detectors.

## **B.Sc. Electronics**

### **A14- Microprocessors- Architecture and Programming**

At the end of this course, a student will have developed ability to:

CO1	Understand the General Architecture of 8085 Microprocessor.
CO2	Identify various 8085 instructions and Timing Diagrams.
CO3	Develop the skill in Assembly Language Programming.
CO4	Practice Advanced Programming techniques.
CO5	Interpret different Programmable peripheral Devices .
CO6	Understand 8086 Microprocessor Architecture.

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### **ELE4B06- ANALOG INTEGRATED CIRCUITS**

At the end of this course, a student will have developed ability to:

CO1	Understand the characteristics and internal blocks of IC 741 Op-Amp.
CO2	Understand the basic working of Op-Amp Amplifiers.
CO3	Differentiate the working of Butter worth filters and wave form generators using Op-Amp.
CO4	Interpret the working of comparators using IC 741 Op-Amp.
CO5	Illustrate the working of Multivibrators using IC 555 timer.
CO6	Compare the basic circuit configuration and characteristics of voltage regulators.

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### **ELE4B08- ANALOG INTEGRATED CIRCUITS LAB**

At the end of this course, a student will have developed ability to:

CO1	Design different Amplifier configurations using Op-Amp IC 741
CO2	Design different filters, wave form generators and comparators using Op-Amp
CO3	Compare the working of Multivibrators using IC 555 timer
CO4	Understand the working and performance of different voltage regulators



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### **ELE4B09- Skill Development Lab**

At the end of this course, a student will have developed ability to:

<b>CO4</b>	<b>Design and Development of a mini project based on Skill Development Lab 1 and Core Courses 1- 4</b>
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## **B.Sc. Electronics**

### **ELE5B10- ELECTROMAGNETIC THEORY**

At the end of this course, a student will have developed ability to:

CO1	Understand fundamentals of vector operation.
CO2	Illustrate the concept of gradient, divergent and curl in rectangular coordinates
CO3	Sketch transformation between various coordinates.
CO4	Understand the fundamentals of electrostatics
CO5	Understand the fundamentals of magnetostatics.
CO6	Describe electromagnetic fields and waves
CO7	Interpret electromagnetic waves in free space and conducting medium.
CO8	Understand the fundamentals of antennas and its parameter

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### **ELE5B11- MICROCONTROLLER & INTERFACING**

At the end of this course, a student will have developed ability to:

CO1	Understand the architecture of 8051 microcontroller
CO2	Understand bus organization, memory organization, addressing modes and instruction set of 8051 microcontroller
CO3	Identify different timers and serial modes of 8051 microcontroller
CO4	Understand the interrupts of 8051 microcontroller
CO5	Describe the architecture of arduino
CO6	Interpret different data types and variables in embedded c and arduino IDE.

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### **ELE5B12- NETWORK THEORY**

At the end of this course, a student will have developed ability to:

CO1	Understand the assumptions and concepts of circuit analysis
CO2	Analyze series and parallel passive networks
CO3	Illustrate different methods for solving networks and circuits
CO4	Understand the DC Transient analysis of RC, RL and RLC circuits
CO5	Understand the Sinusoidal Circuit Analysis for RL, RC and RLC Circuits
CO6	Understand the concept of series resonance
CO7	Understand the concept of parallel resonance
CO8	Design passive filters for different pass band characteristics

## **B.Sc. Electronics**

### **ELE6B17- MICROPROCESSOR & MICROCONTROLLER PROGRAMMING AND INTERFACING LAB**

At the end of this course, a student will have developed ability to:

CO1	Remember the fundamentals of assembly level programming of microprocessor 8085
CO2	Familiarize Python using Raspberry Pi.
CO3	Understand the programming strategies and select proper mnemonics and run their program on training boards and interfacing modules of 8051 microcontroller
CO4	Familiarize with Arduino IDE, programming to provide knowledge of Arduino boards and basic components.

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### **ELE6B20- Industrial Visit & Project Work**

At the end of this course, a student will have developed ability to:

CO1	Understand the practical applications of instruments handled during course curriculum.
CO2	Relate about Industry Practices and career opportunities.
CO3	Acquaint Students with Interesting Facts and Newer Technologies to generate new entrepreneurs.
CO4	Develop the ability in creative thinking and finding viable solutions to real life problems

## **B.Sc. Electronics**

### **ELE5D01- COMPUTER HARDWARE**

At the end of this course, a student will have developed ability to:

CO1	Understand the evolution and knowledge of computer hardware
CO2	Classify the concepts of number systems and logic gates.
CO3	Identify different hardware components such as processor, memory, hard disk, mother board, input and output devices used in computers.
CO4	Distinguish the features of the hardware components of a computer.

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### **ELE5D02- DIGITAL FUNDAMENTALS**

At the end of this course, a student will have developed ability to:

CO1	Understand the advantages of digital electronics.
CO2	Describe the concepts of number systems and logic gates.
CO3	Compute and evaluate Boolean expression and its reduction using k-map
CO4	Understand the basic concepts of latches and flip flops
CO5	Analyse different registers and counters



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### **ELE5D03- ELECTRONIC FUNDAMENTALS**

At the end of this course, a student will have developed ability to:

CO1	Distinguish the basic components in electronics.
CO2	Understand the basics of testing and measuring instruments in the circuit assembling
CO3	Apply and evaluate troubleshooting of circuits
CO4	Understand AC and DC fundamentals of circuits

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### **ELE6B13- COMMUNICATION SYSTEM**

At the end of this course, a student will have developed ability to:

CO1	Interpret the fundamentals of basic communication system, types of noise affecting communication.
CO2	Illustrate the need of modulation, modulation process and different amplitude modulation schemes
CO3	Interpret FM modulation techniques, its generation and detection
CO4	Identify the various radio receivers with their parameters.
CO5	Understand various modes of wave propagation
CO6	Infer the generation and detection of pulse modulation techniques and multiplexing.
CO7	Exploring the need of sampling and different sampling techniques.
CO8	Identify the Digital modulation techniques

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### **ELE6B14- PRINCIPLES OF DSP**

At the end of this course, a student will have developed ability to:

CO1	Understand various types of signals and their representations.
CO2	Identify the properties of signals.
CO3	Differentiate various classification of systems
CO4	Compute convolutions
CO5	Compute FFT
CO6	Compute discrete Fourier transform.
CO7	Compare different IIR systems
CO8	Compare different of FIR systems

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### **ELE6B15- MICROWAVE THEORY AND TECHNIQUES**

At the end of this course, a student will have developed ability to:

CO1	Understand about microwave bands, spectrum and their applications.
CO2	Identify different wave guides and principles of wave propagations.
CO3	Understand the basics of transmission lines
CO4	Compare Waveguide Tees
CO5	Understand different microwave tubes
CO6	Understand about velocity modulation and beam bunching
CO7	Understand the principle of operation and performance of diodes
CO8	Understand about Gunn effect and Gunn diode

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### **ELE6B18- COMMUNICATION SYSTEM LAB**

At the end of this course, a student will have developed ability to:

CO1	Construct the basic circuits of communication system.
CO2	Design various pulse modulation schemes
CO3	Analyze different analog modulation schemes.
CO4	Design basic circuits using IC 555 and IC 741

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### **ELE6B19- PRINCIPLES OF DSP LAB**

At the end of this course, a student will have developed ability to:

CO1	Familiarize DSP simulation software ( MATLAB).
CO2	Understand discrete time systems and their properties.
CO3	Understand AM and FM signals
CO4	Design FIR and IIR filters.

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### **ELE6B20- INDUSTRIAL VISIT & PROJECT WORK**

At the end of this course, a student will have developed ability to:

CO5	Compare the innovations in design of products, processes or systems.
CO6	Manage the conduct of the research study and the ability to work in teams

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### **ELE6B16a - OPTICAL COMMUNICATION**

At the end of this course, a student will have developed ability to:

CO1	Understand the basic optical fiber communication technology
CO2	Understand attenuation, dispersion and weakening of optical signal
CO3	Differentiate passive fiber optic devices
CO4	Classify different active fiber optic devices



## **B.Sc. Electronics**

### **ELE6B16b - INDUSTRIAL ELECTRONICS**

At the end of this course, a student will have developed ability to:

CO1	Identify power semiconductor devices
CO2	Understand different types of rectifiers
CO3	Distinguish various types of rectifiers, choppers and inverters
CO4	Illustrate the use of SMPS
CO5	Understand the working of UPS

## **B.Sc. Electronics**

### **ELE6B16c - CONTROL SYSTEMS**

At the end of this course, a student will have developed ability to:

CO1	Understand the classifications of control system .
CO2	Understand the fundamentals of Laplace transform.
CO3	Illustrate overall gain using laplace transform, block diagram reduction and signal flow graph methods.
CO4	Understand the performance characteristics of control system
CO5	Compute stability of the system using various methods.
CO6	Illustrate various controllers and compensators

## **B.Sc. Electronics**

### **ELE6B16d - VERILOG & FPGA BASED SYSTEM DESIGN**

At the end of this course, a student will have developed ability to:

CO1	Understand combinational and sequential circuit elements.
CO2	Understand Finite state machines
CO3	Understand the principle of programmable logic device
CO4	Illustrate programmable logic devices architectures.
CO5	Practice Verilog HDL