# SYLLABUS FOR B.SC (ELECTRONICS)

**CBCS pattern, 2021-2022 onwards**

**MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI**

# REGULATIONS

## DURATION OF THE COURSE:

**Three Years** divided into **Six semesters**. Each semester will be of 90 working days.

## COURSE OF STUDY:

It's under CBCS (Choice Based Credit System) pattern according to the syllabus and books prescribed from time to time.

## ELIGIBILITY:

As per the guidelines for the admission of Under Graduate (UG) students by Department of Collegiate Education, Chennai.

## FOUNDATION SUBJECTS:

PART I: Tamil / Hindi / Malayalam as per MSU guidelines
PART II: English

## ALLIED SUBJECTS:

Have to choose any two allied subjects apart from the core/major subjects. (For. e.g. Mathematics, Physics, Computer Science, Information Technology (IT), Chemistry...)

## SCHEME OF EXAMINATIONS:

As per the CBCS pattern with SE (Secured External Examinations score) and IA (Internal Assessment score)

## QUESTION PAPER PATTERN FOR ALL UG COURSES:

**THEORY PAPERS:**

**MARKS FOR INTERNAL:** (MAX. Marks: 25, Passing minimum: 10 marks)
Marks distribution:
Cycle test and model exam: 20 marks
Assignment : 5 marks
Total : 25 marks

**MARKS FOR EXTERNAL:** (Max. Marks: 75, Passing minimum: 30 marks, Time: 3 Hours)

1. Part A (10 x 1= 10 marks), Answer All questions, Two questions from each unit
2. Part B (5 x 5 = 25 marks), Answer All questions, One question from each unit with internal Choice
3. Part C (5 x 8 = 40 marks), Answer All questions, One question from each unit with internal Choice

**PRACTICAL PAPERS:**

TIME: 3 Hours, Maximum Marks: 50 (External) and 50 (Internal). Marks will be calculated by laboratory performance, attendance, record note book maintenance, model practical's examination.

**MINI PROJECT, INERNSHIP / FIELD WORK (maximum marks):** IA: 50 marks and SE: 50 marks
**PROJECT WORK (maximum marks):** IA: 50 marks and SE: 50 marks
**MOOCS course (maximum marks):** IA: 25 marks and SE: 75 marks

| Sl.No | Category of Subjects | Contact Hrs/week | Credits | Max Marks &Exam Time (SE:IA/ Hrs) |
|---|---|---|---|---|
| **SEMESTER I** | | | | |
| 1. | Language-Tamil/Other | 6 | 4 | 75:25/3 |
| 2. | Language-Communicative English | 6 | 4 | 75:25/3 |
| 3. | Core Theory-1, Basic Electronic Devices | 4 | 4 | 75:25/3 |
| 4. | Professional English for Physical Sciences - I | 4 | 4 | 75:25/3 |
| 5. | Core- Practical I-Basic Electronic Devices Lab | 3 | 2 | 50:50/3 |
| 6. | Allied-Theory- I (for Electronics)-Introduction of C language,<br>Allied-Theory- I (for others)-Basic Electronics | 3 | 3 | 75:25/3 |
| 7. | Allied Practical I (for Electronics)-Programming in C<br>Allied Practical I (for others)-Basic Electronics Lab | 2 | 2 | 50:50/3 |
| 8. | Common-Environmental studies | 2 | 2 | 75:25/3 |
| **Subtotal** | | **30** | **25** | |
| **SEMESTER II** | | | | |
| 9. | Language-Tamil/Other | 6 | 4 | 75:25/3 |
| 10. | Language-Communicative English | 6 | 4 | 75:25/3 |
| 11. | Core Theory-2, Digital Electronics | 4 | 4 | 75:25/3 |
| 12. | Professional English for Physical Sciences - II | 4 | 4 | 75:25/3 |
| 13. | Core- Practical II-Digital Electronics Lab | 3 | 2 | 50:50/3 |
| 14. | Allied-Theory- II (for Electronics)- Introduction to Python Language<br>Allied-Theory- II (for others)-Introduction to Digital Electronics | 3 | 3 | 75:25/3 |
| 15. | Allied Practical II (for Electronics)-Programming in Python<br>Allied Practical II (for others)-Digital Electronic Circuits Lab | 2 | 2 | 50:50/3 |
| 16. | Common-Value Based Education | 2 | 2 | 75:25/3 |
| **Subtotal** | | **30** | **25** | |

**Total number of core courses: 30** (14-Theories + 2-skill-based core + 2-Electives + 8-Practicals +1-FW/Internship + 1-Project +1-Miniproject + 1-online initiative courses-MOOC)

**Total number of Elective courses: 2** (in V and VI-semesters with having **Two** options in each semester, respectively)

**Skill based core courses: 2**

**Skill based common courses: 5**

**Allied Theory + Allied Practical courses (for major students): 4 + 4 = 8**

**Allied Theory + Allied Practical courses (for other major students): 4 + 4 = 8**

**Total Hours / Week = 180 for 6 semesters (i.e., 3 years)**

**MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – I / Core-1**

# BASIC ELECTRONIC DEVICES

**LTPC**
**0 4 0 4**

**OBJECTIVES:**

- To provide in-depth knowledge of basic semiconductors, active and passive components.

**UNIT I**

Type of resistors – color code –construction of various types of resistors (carbon composition, carbon film, wire-wound etc.)– power ratings - capacitors (ceramic, mica polystyrene electrolytic) – fixed and variable capacitors **(10L)**

**UNIT II**

Atomic structure, Bohr's atom model – energy levels -energy bands –classification of solids and energy bands – forbidden energy gap – intrinsic and extrinsic semiconductors, P type and N type semiconductors– majority and minority carriers

**(12L)**

**UNIT III**

PN junction- Biasing a PN junction – forward and reverse biasing – PN junction diode: characteristics -static and dynamic resistance - diode rectifiers: Half wave and Full wave rectifier – Bridge rectifier – clippers and clampers - Zener diode –Characteristics-voltage regulation using Zener diode **(12L)**

**UNIT IV**

Bipolar transistor – UJT – Common Base, Common Emitter & Common Collector configurations and their characteristics – transistor biasing methods - Transistor as switch, amplifier – SCR **(10L)**

**UNIT V**

FET Constructional features-working Principle, features and characteristics - JFET and MOSFET and their characteristics – enhancement and depletion type

**(10L)**
**Total:54L)**

**TEXT BOOKS:**


1. V.K.Mehta, "Principles of electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state electronics", S.Chand & Co


**COURSE RESULTS:** This will help the students to understand the basic electronic devices

**Semester – I / Core Practical -1**

# BASIC ELECTRONIC DEVICES LAB

**L T P C**
**0 0 3 2**

**OBJECTIVES:**

- To provide practical knowledge of active and passive components

1. PN Junction diode Characteristics
2. Zener diode Characteristics
3. Bipolar Junction Transistor (BJT) Characteristics (Input and Output) – Common Base (CB)
4. BJT Characteristics (Input and Output) – Common Emitter (CE)
5. BJT Characteristics (Input and Output)– Common Collector (CC)
6. Measurement of stability factor of self-biasing method
7. Measurement of stability factor of fixed-biasing method
8. Field Effect Transistor (FET) characteristics
9. Photoconductivity measurements of LDR
10. Photodiode characteristics
11. SCR characteristics
12. Phototransistor characteristics.

**COURSE RESULTS:**

This will help the students to understand and operate with the basic electronic devices practically.

**Semester – I / Allied Theory -1**

# INTRODUCTION OF C LANGUAGE

**LTPC**
**0 3 0 3**

**OBJECTIVES:**

- To understand and develop basic C program data structures, concepts and statements
- To develop applications in C using functions, pointers and structures

**UNIT I**

**INTRODUCTION**: Concept of Programming Languages - High Level, Low Level, Assembly Language – Concept of Algorithms and Flow Charts - Language translators: Assemblers, Compilers, Interpreters (Only concept and differences)

**(9L)**

**UNIT II**

**DATA CONCEPTS**: Overview of C, Features of C fundamentals - Character Set, Identifiers, Keywords, Data Types, Constants, Variables, Operators - Arithmetic, Logical, Relational, Unary, Assignment, Conditional and Bitwise Operators – expressions.

**(9L)**

**UNIT III**

**STATEMENTS**: Structure of C Program - Library Functions - Data input and output, Compilation and Execution of C programs - Control Statements - IF Statement, IF…ELSE Statement, Nesting of IF …Else Statement – Operator - Switch Statement - Loop Controls – FOR, WHILE, DO-WHILE Loops, Break Continue, Exit, GO...TO Statement.

**(9L)**

**UNIT IV**

**FUNCTIONS**: The Need of a Function - definition - User Defined and Library Function - Prototype of a Function - Calling of a function - Function Argument - Passing arguments to function - Return Values - Nesting of Function - main () - Command Line Argument - Recursion.

**(9L)**

**UNIT V**

**ARRAYS AND STRINGS**: Arrays -Single and Multi-dimensional arrays, Declaration and Initialization of arrays and strings, pointers and one-dimensional arrays-Structures-Definition, declaration of structure variables, accessing structure members unions-Data files-opening and closing a data file, creating a data file. **(9L)**

**TEXT BOOKS** **(Total: 45L)**

1. E. Balaguruswami, Programming with C, TMH.
2. Byron Gottfried, Programming with C, Schaum's Outline Series,TMH.

**REFERENCES**

1. Mahapatra, Thinking in C, PHI.
2. Brain W Kernighan and Dennis M Ritchie, The C Programming language, PHI.
3. Dennis & Ritchie: “Programming in C”.

**COURSE RESULTS:** This will help the students to understand the basic introduction of C programming language.

**Semester – I / Allied Theory -1 (for major students)**

# BASIC ELECTRONICS

**LTPC**
**0 3 0 3**

**OBJECTIVES:**

- To acquire the knowledge of active and passive components of various electronic devices and their characteristics.

**UNIT I**

**SEMICONDUCTOR BASICS:** Introduction to semiconductor materials, intrinsic & extrinsic semiconductors. p-type semiconductors, n- type semiconductors, p-n junction diode **(9L)**

**UNIT II**

**DIODE CIRCUITS:** Clipper circuits, clamping circuits. half wave rectifier, Center tapped and bridge full wave rectifiers, DC power supply: Block diagram of a power supply, Zener diode as voltage regulator **(9L)**

**UNIT III**

**BIPOLAR JUNCTION TRANSISTOR (BJT):** Basic transistor action, Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, UJT: construction and working

**(9L)**

**UNIT IV**

**FEEDBACK AMPLIFIERS:** Concept of feedback, negative and positive feedback, Positive feedback:

Barkhausen criteria for oscillations, Study of Hartley, Colpitts oscillator and crystal oscillator **(9L)**

**UNIT V**

**JUNCTION FIELD EFFECT TRANSISTOR (JFET):** Construction of JFET, Metal Oxide Field Effect Transistor (MOSFET): Basic Construction of MOSFET and working, enhancement and depletion modes.

**(9L)**

**TEXT AND REFERENCE BOOKS:**

**(Total: 45L)**


1. Basic and Applied Electronics - T. K Bandyopadhyay, Books and Allied Pvt Ltd (2002)
2. V.K.Mehta, "Principles of Electronics", S.Chand& Co
3. B.L.Theraja, "Basic solid state Electronics", S.Chand&Co
4. R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education (2006).
5. N Bhargava, D C Kulshreshtha and S C Gupta, Basic Electronics and linear circuits, Tata McGraw-Hill (2007).
6. J. Millman and C. Halkias, Integrated Electronics, Tata McGraw Hill (2001).
7. David A. Bell, Electronic Devices & Circuits, Oxford University Press, Fifth edition
8. Mottershed, Electronic Devices, PHI Publication, 1st Edition.


**COURSE RESULTS:** This will help the students to understand the basic electronic devices

**Semester – I / Allied Practical -I (for major students)**

## PROGRAMMING IN C

**LTPC**
**0 0 2 2**

**OBJECTIVES:**

- To write and test simple C programs.
- Familiarization of important features of C.

1. Testing and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.

2. 1-D Arrays: A variety of programs to declare, initialize, read, print and process 1-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

3. Pointers: A large number of trivial programs involving all possible data types to familiarize the syntax of pointers in a variety of situations and to draw memory diagrams based on the observations.

4. Structures: A variety of programs to declare, initialize, read, print and process structures made up of a variety of data types and structures.

5. 2-D Arrays: A variety of programs to declare, initialize, read, print and process 2-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

6. Array of Structures and Structure of Arrays: Programs to demonstrate declaration and processing of structure of arrays and array of structures.

7. Pointers to Arrays: A number of programs to demonstrate handling of 1-D and 2-D arrays using pointers and to draw memory diagrams based on the observations.

8. Pointers to Structures: A number of programs to demonstrate use of pointers to structures and to draw memory diagrams based on the observations.

9. Functions –I: Simple Examples of declaring and using functions of the following categories (i) no argument, no return, (ii) argument, no return, (iii) no argument, return, (iv) argument, return, all pass by value

10. Functions –II: Declaring and using functions with pass by reference, Passing and returning structures, recursive functions.

11. Debugging programs involving syntactic and/or logical errors

12. Developing programming solutions to problems including program design, algorithm development and data structure selection.

**REFERENCES**

1. Deitel & Deital, C: How to Program, Pearson Education, Alan R Feuer, The C Puzzle Book, Pearson Education
2. Yashvant Kanetkar, Test Your C Skills, BPB Publications, 3rd Edition

**Internet resources:**

1. www.cprogramming.com
2. www.programmersheaven.com

**COURSE RESULTS:** This will help the students to practice with C programing.

**Semester – I / Allied Practical -1 (for other major students)**

# BASIC ELECTRONICS LAB

**LTPC**
**0 0 2 2**

**OBJECTIVES:**

- To equip with the basic semiconductors, active and passive components

1. PN Junction diode Characteristics
2. Zener diode Characteristics
3. Bipolar Junction Transistor (BJT) Characteristics (Input and Output) – Common Base (CB)
4. BJT Characteristics (Input and Output) – Common Emitter (CE)
5. BJT Characteristics (Input and Output)– Common Collector (CC)
6. Measurement of stability factor of self-biasing method
7. Measurement of stability factor of fixed-biasing method
8. Field Effect Transistor (FET)characteristics
9. Photoconductivity measurements of LDR
10. Photodiode characteristics
11. SCR characteristics
12. Phototransistor characteristics.

**COURSE RESULTS:**
This will help the students to understand and operate with the basic electronic devices practically.

**Semester – II / Core Theory-2**

# DIGITAL ELECTRONICS

**LTPC**
**0 4 0 4**

**OBJECTIVES:**

- To impart the theoretical knowledge of code conversion, Boolean algebra, logic gates, combinational and sequential logic, and converters. After completion of this course, the students will be able to convert one number system to another number system, construct truth tables for logic gates, simplify Boolean expression.

**UNIT I**

**NUMBER SYSTEM AND CODES:** Decimal, Binary, Octal and Hexadecimal number systems, base conversions. representation of signed and unsigned numbers, BCD code. binary, octal and hexadecimal-BCD-Excess3, gray code-alphanumeric codes. **(12L)**

**UNIT II**

**DIGITAL LOGIC FAMILIES:** Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, comparison of TTL and CMOS families. Truth Tables of OR, AND, NOT, NOR, NAND, EX-OR, Universal gates, Basic postulates and fundamental theorems of Boolean algebra, Demorgan's Theorem. Karnaugh Maps: two, three and four variable K-Map **(12L)**

**UNIT III**

**ARITHMETIC CIRCUITS:** Binary addition. Half and Full Adder. Half and Full subtractor, Binary Adder/Subtractor. Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker – parity generators – code converters **(12L)**

**UNIT IV**

**LATCHES:** Latches, Flip-flops - SR, JK, D, T, and Master-Slave -Edge triggering – Level triggering asynchronous ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Programmable counters – Modulo–n counter (**12L)**

**UNIT V**

**REGISTERS AND MEMORIES:** Registers – shift registers - Universal shift registers – Shift register counters – Ring counter – Shift counters-Memory devices -classification of memories – ROM - ROM organization - PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization – Static RAM Cell **(12L)**

(**Total: 60L)**

**TEXT AND REFERENCE BOOKS:**


1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)


**COURSE RESULTS:** This will help the students to understand the number systems and digital electronics (IC's, Flipflop, Register, Counters & Memories)

**Semester – II / Core Practical -2**

# DIGITAL ELECTRONICS LAB

**LTPC**
**0 0 3 2**

## OBJECTIVES:

- To provide the practical knowledge of digital logic Integrated Circuit (IC)s, flip-flops, registers, counters and memories.

1. Study and verify truth tables of AND, OR, NOT, NAND, NOR and XOR gates
2. Design all logic gates using NAND gate
3. Design all logic gates using NOR gate
4. Verify Demorgan's theorem.
5. Construction of gates using discrete components
6. Code conversion
7. Truth table verification of Half adder and Full adder
8. Truth table verification of Half subtractor and Full subtractor
9. Multiplexer using 74153 IC and De-Multiplexer using 74155 IC
10. Encoder using 74147 IC and Decoder using 7442 IC
11. Study of M-S and J-K Flip flops using 7476 IC
12. Parallel-in and Parallel-out Shift register using 7495 IC
13. Up counter using 7490 IC or 7493 IC
14. Clock generation using NAND or NOR gate

## COURSE RESULTS:

- This will help the students to understand and operate with the digital electronic devices (ICs, flip-flops, registers, counters and memories) Practically.

**Semester – II / Allied Theory –2 (for major students)** **LTPC**

**0 3 0 3**

# INTRODUCTION OF PYTHON LANGUAGE

**OBJECTIVES:**

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand the high-performance programs designed to strengthen the practical expertise.

**UNIT – I**

**BASICS OF PYTHON PROGRAMMING:** Features of Python, variables and identifiers, operators and expressions. **Decision control Statements:** Selection/Conditional branching statements, basic loop structures/iterative Statements, nested loops, break, continue, and pass Statements. **Functions and Modules:** function definition, function call, more on defining functions, recursive functions, modules. **(9L)**

**UNIT - II**

**DATA STRUCTURES: Strings:** Introduction, built-in string methods and functions, slice operation, String Module. Regular Expressions. **Lists:** Introduction, nested list, cloning lists, basic list operations, list methods. **Functional programming** filter(), map(),reduce() function. **(9L)**

**UNIT - III**

**FILES AND EXCEPTIONS:** Read and writing files, pickling, handling exceptions. Built-in and user-defined exceptions. OOPS Concepts: Introduction, classes and object, class method and self-argument, the init () method, class variables and object variables, public and private data members, Inheritance, Operator Overloading. **(9L)**

**UNIT – IV**

**TUPLES:** Introduction, basic tuple operations, tuple assignment, tuples for returning multiple values, nested tuples, tuple methods and functions. **Set:** Introduction, Set operations. **Dictionaries:** Basic operations, sorting items, looping over dictionary, nested dictionaries, built-in dictionary functions. **(9L)**

**UNIT - V**

**GRAPHICAL USER INTERFACES**: Behavior of terminal-based programs and GUI-based programs, Coding simple GUI-based programs, other useful GUI resources. **GUI Programming:** Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing, Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons. **(9L)**

**(Total: 45L)**

**TEXT AND REFERENCE BOOKS:**


1. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning.
2. Think Python First Edition, by Allen B. Downey, Orielly publishing
3. Reema Thareja, "Python programming using problem solving approach", Oxford university press.
4. Allen Downey," Think Python: How to Think Like a Computer Scientist", O'Reilly publications,2nd Edition.
5. Albert Lukaszewski, "Mysql for python ", PACKT publishers
6. Mark Lutz, "Learning Python", O'Reilly Publications.
7. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition (2015), Pearson India
8. Mark J Guzdial, Introduction to Computing and programming in Python, 3rd Edition (2013), Pearson India
9. http://nptel.ac.in/courses/117106113/34
10. www.scipy-lectures.org/intro/language/python_language.html


**COURSE RESULTS:** This supports the students to understand the programming basics and design with functions using Python programming language

**Semester – II / Allied Theory –2 (for other major students)**

# INTRODUCTION TO DIGITAL ELECTRONICS

**LTPC**
**0 3 0 3**

**OBJECTIVES:**

- To provide theoretical knowledge about digital logic Integrated Circuit (IC)s, flip-flops, registers, counters and memories.

**UNIT I**
**NUMBER SYSTEM AND CODES:** Decimal, Binary, Octal and Hexadecimal number systems, base conversions of whole number. BCD code. Binary, octal and hexadecimal arithmetic. **(9L)**

**UNIT II**
**DIGITAL LOGIC FAMILIES:** Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, comparison of TTL and CMOS families. Truth Tables of OR, AND, NOT, NOR, NAND, EXOR gates, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem. **(9L)**

**UNIT III**
**ARITHMETIC CIRCUITS:** Binary Addition. Half and Full Adder. Half and Full Subtractor, Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker– code converters **(9L)**

**UNIT IV**
**LATCHES:** Latches and Flip flops, S-R Flip flop, J-K Flip flop, T and D type Flip flops, Counters (synchronous and asynchronous), ring and modulo- n-counters, Registers – shift registers. **(9L)**

**UNIT V**
**MEMORY DEVICES:** Classification of memories – ROM PROM – EPROM – EEPROM – EAPROM, RAM – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell Programmable Logic Devices **(9L)**

**(Total: 45L)**

**TEXT AND REFERENCE BOOKS:**


1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H. Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill, (1994)


**COURSE RESULTS:** This will help the students to understand the number systems and digital electronics ICs, flip-flops, registers, counters and memories.

**Semester – II / Allied Practical –2 (for major students)**

# PROGRAMMING IN PYTHON

**LTPC**

**OBJECTIVES:** **0 2 0 2**

- Students should learn problem solving skills with able to write a program in Python language

**At least the following Python concepts should be covered in the lab sessions:**

1. Give a practice with expressions, conditionals, loops, list, dictionary, and strings.
2. Find the largest and smallest numbers in a list.
3. Find the third largest number in a list.
4. Test for primarily.
5. Find whether a string is a palindrome or not.
6. Given two integers x and n, compute x n.
7. Compute the greatest common divisor and the least common multiple of two integers.
8. Test if a number is equal to the sum of the cubes of its digits.
9. Find the smallest and largest such numbers.

**COURSE RESULTS:** Students can able to learn and develop basic computational skills with Python language.

**Semester – II / Allied Practical –2 (for other major students)**

# DIGITAL ELECTRONIC CIRCUITS LAB

**L T P C**
**0 0 2 2**

**OBJECTIVES:**

- To provide the practical knowledge of digital logic Integrated Circuit (IC)s, flip-flops, registers, counters and memories.
- Learn the characteristics of digital logic gates and verify various theorems

1. Study and verify truth tables of AND, OR, NOT, NAND, NOR and XOR gates
2. Design all logic gates using NAND gate
3. Design all logic gates using NOR gate
4. Verify Demorgan's theorems
5. Construct gates using discrete components
6. Code conversion
7. Truth table verification of Half adder and Full adder
8. Truth table verification of Half subtractor and Full subtractor
9. Multiplexer using 74153 IC and De-Multiplexer using 74155 IC
10. Encoder using 74147 IC and Decoder using 7442 IC
11. Study of M-S and J-K Flipflops using 7476 IC
12. Parallel-In Parallel-Out Shift register using 7495 IC
13. Up counter using 7490 IC or 7493 IC
14. Clock generation using NAND or NOR gate

**COURSE RESULTS:** This will help the students to understand the operations of basic digital electronic devices (ICs, flip-flops, registers, counters and memories) practically.