

# MODEL SYLLABUS FOR B.Sc. ELECTRONICS, SEMESTERS III & IV

## SEMESTER: III

Course Code	SSC0220	Course Title	DIGITAL ELECTRONICS AND IC
Course Credits	03	Hour of Teaching / Week	03
Total Contact Hours	48	Formative Assessment Marks	20
Exam Marks	80	Exam Duration	3 Hours

### Course Content

Content		Hours
<b>UNIT – 1</b>	<b>DIGITAL ELECTRONICS</b>	
	<b>Number system and codes:</b> Binary, hexadecimal and decimal Number systems and their inter conversion, BCD numbers, gray code, excess-3 code, code conversion. Binary addition and subtraction (using 1's and 2's complement method). <b>Boolean Algebra:</b> Basic logic circuits: Logic gates, Universal Gates, Laws of Boolean algebra, De-Morgan's theorem, SOP, POS, Min term, Max term, Simplification by Boolean theorems and K-Map, K-Map with don't care condition, Quine-McCluskey minimization technique.	<b>12</b>
<b>UNIT – 2</b>	<b>COMBINATIONAL CIRCUITS</b>	
	<b>Combinational Logic:</b> Introduction to combinational circuits, code conversions, binary adder, binary subtractor, encoder, decoder, multiplexers, Demultiplexer, Binary comparator, Magnitude Comparator, and Programmable arrays logic	<b>12</b>
<b>UNIT – 3</b>	<b>SEQUENTIAL CIRCUITS</b>	
	<b>Sequential circuits:</b> Introduction to Sequential circuits, R-S flip-flop, D -flip flop, J-K Flip-flop, Master slave Flip flop & T flip-flop. <b>Counters:</b> Asynchronous counter: 4 bit – Up, down, Up/down and Decade Counter. Synchronous counter operation: 4 bit – Up, down counter and Decade Counters - design using excitation table and equations. Johnson counter and ring counter. <b>Registers:</b> SISO, SIPO, PISO and PIPO, Bi-directional register. Universal Shift Register.	<b>12</b>
<b>UNIT – 4</b>	<b>IC AND DIGITAL LOGIC FAMILIES</b>	
	<b>Integrated circuits (IC):</b> Introduction, classifications based on size and fabrication technology IC fabrication: steps involved in monolithic IC fabrication- fabrication of Resistor, Diodes and Transistor using monolithic technology. Thin film & thick film techniques. Thin film resistors and capacitors. <b>Digital Logic families:</b> Unipolar logic and Bipolar logic families. Characteristics of logic families. TTL families – TTL NAND and TTL NOR gates. CMOS families – CMOS as an Inverter, NOR and NAND gates, comparative study of TTL and CMOS	<b>12</b>

### Reference Books:

1. Digital Fundamentals by Morris and Mano, PHI Publication
2. Robert L. Boylestad & Louis Nashelsky, Electronic Devices & Circuit Theory
3. Fundamental of digital circuits by A.ANANDKUMAR, PHI Publication
4. Digital Fundamentals by FLOYD & JAIN, Pearsons Pub

Course Code		Course Title	<b>DIGITAL ELECTRONIC LAB</b>
Course Credits	<b>02</b>	Hour / Week	<b>04</b>
Total Contact Hours		Formative Assessment Marks	<b>10</b>
Exam Marks	<b>40</b>	Exam Duration	<b>3 Hours</b>

## Lab Content

Minimum of **TEN** Experiments to be performed

1	Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR gates using IC
2	Design and verification all the gates using universal NAND gate
3	Design and verification of 4 bits Binary to gray and gray to Binary convertor
4	Design of 4-bit magnitude comparator
5	Design of half adder and full adder
6	Design of half subtractor and full subtractor
7	Design of Parallel adder
8	Design of encoder and decoder
9	Design of 4:1 multiplexer and 1:4 demultiplexer
10	Verification of S-R and D flip flop
11	Verification of J-K and T flip flop
12	Design of Mod - n counter
13	Design of Ring counter
14	Design of shift register

## Core Elective

Course Code		Course Title	<b>ELECTRONIC DOMESTIC APPLIANCES</b>
Course Credits	<b>02</b>	Hour of Teaching / Week	<b>02</b>
Total Contact Hours	<b>30</b>	Formative Assessment Marks	<b>10</b>
Exam Marks	<b>40</b>	Exam Duration	<b>1 ½ Hours</b>

## Course Content

Content		Hours
<b>UNIT – 1</b>	<b>MICROWAVE OVENS AND WASHING MACHINES</b>	
	<b>Microwaves</b> - Properties and generation - Microwave oven block diagram - LCD timer with alarm - Controllers - Wiring and Safety instructions - Care and Cleaning <b>WASHING MACHINES</b> Electronic controller for washing machines - Washing machine hardware and software - Types of washing machines - Fuzzy logic washing machines - Features of washing machines.	<b>10</b>
<b>UNIT – 2</b>	<b>AIR CONDITIONERS AND REFRIGERATORS</b>	
	Air Conditioning - Components of air conditioning systems - All water air conditioning systems – All air conditioning systems - Unitary and central air conditioning systems - Split air conditioners.	<b>10</b>
<b>UNIT – 3</b>	<b>DIGITAL ACCESS DEVICES</b>	
	Barcode Scanner and decoder - Electronic Fund Transfer - Automated Teller Machines (ATMs) – Set-Top boxes - Digital cable TV - Video on demand	<b>10</b>

## Reference Books:

1. Consumer Electronic - S.P. Bali, Pearson Education, New Delhi, 2005

## SEMESTER: IV

Course Code	<b>SSD0220</b>	Course Title	<b>COMPUTER FUNDAMENTALS &amp; C PROGRAMMING</b>
Course Credits	<b>03</b>	Hour of Teaching / Week	<b>03</b>
Total Contact Hours	<b>48</b>	Formative Assessment Marks	<b>20</b>
Exam Marks	<b>80</b>	Exam Duration	<b>3 Hours</b>

### Course Content

Content		Hours
<b>UNIT – 1</b>	<b>COMPUTER FUNDAMENTALS AND INTRODUCTION TO C PROGRAMMING</b>	
	Types of Software – System Software and utility Software and application software; Computer languages - Machine Level, Assembly Level & High-Level Languages, Translator, Assembler, Interpreter and Compiler; Computer Program – Algorithm and Flowchart with examples <b>Overview of C</b> - History and Features of C, Structure of a C Program, Creating and Executing a C Program, Compilation process in C.	<b>12</b>
<b>UNIT – 2</b>	<b>C PROGRAMMING CONCEPTS, OPERATOR AND CONTROL STRUCTURES</b>	
	C Character Set, C tokens, Data types, Symbolic constants. Header files, Input and output with C: Formatted and Unformatted I/O functions. Operators and expressions - different types, Operator precedence and Associativity, Evaluation of arithmetic expressions. <b>Control Structures</b> - Different types of decision-making statements, <b>Looping Statements</b> - Entry controlled and exit controlled statements	<b>12</b>
<b>UNIT – 3</b>	<b>ARRAYS AND FUNCTIONS</b>	
	<b>Derived data types in C - Arrays</b> - One Dimensional and Two-Dimensional arrays – Declaration, Initialization and Memory representation. <b>Strings</b> : Declaring & Initializing string variables; String handling functions <b>Functions</b> : Definition, user defined functions; call by value and call by reference.	<b>12</b>
<b>UNIT – 4</b>	<b>STRUCTURES AND POINTERS</b>	
	<b>Structures</b> – declaring structure variables, accessing structure members, Structure members' initialization. <b>Unions</b> - Union definition; difference between Structures and Unions. Pointers: declaration, assigning declaration to pointer, pointer arithmetic, pointer used as arrays and pointers as function parameters	<b>12</b>

### Reference Books:

1. E. Balagurusamy: Programming in ANSI C (TMH)
2. V. Rajaraman: Programming in C (PHI – EEE)
3. S. Byron Gottfried: Programming with C (TMH)
4. Yashwant Kanitkar: Let us C

Course Code		Course Title	<b>C PROGRAMMING LAB</b>
Course Credits	<b>02</b>	Hour / Week	<b>04</b>
Total Contact Hours		Formative Assessment Marks	<b>10</b>
Exam Marks	<b>40</b>	Exam Duration	<b>3 Hours</b>

## Lab Content

Minimum of **FIVE** programs from each part to be performed

### PART - A

1	Program to find area, circumference of circle and surface area, volume of a sphere
2	Program to calculate <b>Simple interest</b> and <b>Compound interest</b> .
3	Program to read three numbers and find the <b>biggest among three</b>
4	Program to check whether given number is <b>odd or even</b> .
5	Program to check whether given number is <b>positive, negative or zero</b> .
6	Program to generate n natural numbers and find their <b>sum</b>
7	Program to generate <b>even natural</b> numbers using for loop.

### PART - B

1	Program to read a 4-digit number and to find the <b>sum of the digits</b> .
2	Program to read a 4-digit number and <b>reverse the digits</b> .
3	Program to find <b>Factorial</b> of given number using function
4	Program to check whether given number r <b>prime or not</b>
5	Program to find <b>largest / smallest</b> among n numbers using Array
6	Program to perform addition and multiplication of given matrix
7	Program to read a number, and check it for <b>palindrome or not</b>
8	Program to check the length of <b>string using pointer</b>

## Core Elective

Course Code		Course Title	<b>TRANSDUCERS AND SENSORS</b>
Course Credits	<b>02</b>	Hour of Teaching / Week	<b>02</b>
Total Contact Hours	<b>30</b>	Formative Assessment Marks	<b>10</b>
Exam Marks	<b>40</b>	Exam Duration	<b>1 ½ Hours</b>

## Course Content

Content		Hours
<b>UNIT – 1</b>	<b>RESISTIVE AND CAPACITIVE TRANSDUCER</b>	
	<b>Transducer:</b> Characteristics, advantages and selecting a Transducer, <b>Resistive Transducer:</b> Potentiometer, Resistance pressure transducer, Resistive Position Transducer, Resistance thermometer. Strain Gauges: Resistance wire Gauge (Unbonded And Bonded), Foil strain Gauge, semiconductor strain Gauge. Capacitive Transducer, Load cell (Pressure Cell) and Piezo Electric Transducer	<b>10</b>
<b>UNIT – 2</b>	<b>PHOTOELECTRIC AND TEMPERATURE TRANSDUCER</b>	
	<b>Photoelectric Transducer:</b> Photomultiplier tube, Photocells, Photo-Voltaic cell, Semiconductor Photodiode and Phototransistor. <b>Temperature Transducer:</b> Thermocouple, Thermistor, Resistance Temperature Detector. Magnetic flow meter	<b>10</b>
<b>UNIT – 3</b>	<b>SENSORS</b>	
	<b>Sensors and Actuators:</b> Sensors-Introduction to sensors, types of sensors, application of sensors, basic principles and operations of Thermal Sensors, Optical Sensors, Acoustic Sensors, MEMS, Nano-sensors, Ultrasonic Sensors, Thin Film Sensors, Liquid Level Sensors, Magnetic Sensors, Radiation Sensor <b>Actuators</b> -Introduction to actuators, types of actuators, Logical and Continuous Actuators	<b>10</b>

## Reference Books:

1. Electronic Instrumentation, H S Kalsi, TMH, 2nd Edition, 2010
2. Electronic Instrumentation and Measurements, David A Bell, PHI/ Pearson Education, 2nd Edition, 2012.
3. Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpat Rai&sons, 18th Edition
4. Patranabis D, "Sensors and Transducers", Wheeler publisher, 1994
5. Instrumentation measurement and analysis, Nakra, Choudhary