

<b>CLASS: B. Sc (Information technology)</b>		<b>Semester – I</b>
<b>SUBJECT: Fundamentals of Digital Computing (USIT103)</b>		
<b>Periods per week</b>	<b>Lectures - 5</b>	<b>3 Credits</b>

Unit – I	<b>Data and Information:</b> Features of Digital Systems, Number Systems: Decimal, Binary, Octal, Hexadecimal & their inter conversions, Representation of Data: Signed Magnitude, one's complement & two's complement, Binary Arithmetic, Fixed point representation and Floating point representation of numbers. <b>Codes :</b> BCD, XS-3, Gray code, hamming code, alphanumeric codes (ASCII, EBCDIC, UNICODE), Error detecting and error correcting codes.	<b>8 Lect.</b>
Unit- II	<b>Boolean Algebra:</b> Basic gates (AND, OR, NOT gates), Universal gates (NAND and NOR gates), other gates (XOR, XNOR gates). Boolean identities, De Morgan Laws. <b>Karnaugh maps:</b> SOP and POS forms, Quine McClusky method.	<b>8 Lect.</b>
Unit -III	<b>Combinational Circuits:</b> Half adder, full adder, code converters, combinational circuit design, Multiplexers and demultiplexers, encoders, decoders, Combinational design using mux and demux.	<b>8 Lect.</b>
Unit - IV	<b>Sequential Circuit Design:</b> Flip flops (RS, Clocked RS, D, JK, JK Master Slave, T, Counters, Shift registers and their types, Counters: Synchronous and Asynchronous counters.	<b>8 Lect.</b>
Unit- V	<b>Computers:</b> Basic Organization, Memory: ROM, RAM, PROM, EPROM, EEPROM, Secondary Memory: Hard Disk & optical Disk, Cache Memory, I/O devices	<b>8 Lect.</b>
Unit -VI	<b>Operating Systems:</b> Types (real Time, Single User / Single Tasking, Single user / Multi tasking, Multi user / Multi tasking, GUI based OS. Overview of desktop operating systems-Windows and LINUX.	<b>8 Lect.</b>

**Text Books:** Modern Digital Electronics by R. P. Jain, 3<sup>rd</sup> Edition, McGraw Hill  
 Digital Design and Computer Organisation by Dr. N. S. Gill and J. B. Dixit, University Science Press  
 Linux Commands by Bryan Pfaffaenberger BPB Publications  
 UNIX by Sumitabha Das, TMH

**References:** Digital Principles and Applications by Malvino and Leach, McGrawHill  
 Introduction to Computers by Peter Norton, McGraw Hill

### Term Work for USIT103

- i) Assignments: Should contain at least 2 assignments covering the Syllabus.
- ii) Class Tests: One. Also Known as Unit Test or In-Semester Examinations
- iii) Tutorial : Minimum Three tutorials covering the syllabus

### Practical USIT1P3:

Journal Practical	3 Lectures per week (1 Credit)
<p>List of Practical</p> <ol style="list-style-type: none"><li>1. Study of logic gates (basic and universal)</li><li>2. Verify De Morgan's theorems</li><li>3. Design and implement Half adder and full adder using gates.</li><li>4. Design and implement binary to gray code converter and vice versa using XOR gates.</li><li>5. Design &amp; implement multiplier for two 2-bit binary numbers using minimum number of gates.</li><li>6. Reduce the given numeric form using K-map and implement using gates.</li><li>7. Implement SOP /POS forms using logic gates.</li><li>8. Implement logic gates using multiplexers.</li><li>9. Implement expressions using multiplexers and demultiplexers</li><li>10. Implement 3-bit binary ripple counter using JK flip flops.</li></ol> <p><b>Linux:</b></p> <ol style="list-style-type: none"><li>1. Installation of Linux</li><li>2. Study of Linux Commands with all switches: ls, mkdir, cd, rmdir, wc, cat, mv, chmod, date, time, grep, tty, who, whoami, finger, pwd, man, cal, echo, ping, ifconfig, tar, telnet</li></ol>	