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| **Course Code** | CSU5306 | | | | | | |
| **Level** | 5 | | | | | | |
| **Course Title** | Digital Electronics | | | | | | |
| **Credit value** | 3 | | | | | | |
| **Core/Optional** | Optional | | | | | | |
| **Prerequisites** | (EL/CR in 6 credits from L4 Computer Science courses)  (CSU5304)+(CSU5305) (EL/CR ) and EL/CR in 6 credits from L4 Computer Science courses | | | | | | |
| **Hourly breakdown** | **Theory** | | **Practical**  **hours** | **Independent Learning** | | **Assessments** | **Total hrs.** |
| 21 Sessions X 2 = 4**2 hrs.** | 6 DS x 3 hrs. = **18 hrs.** | 3 Lab x6 hrs.  = **18 hrs.** | * Sessions (21x 3)   = 63hrs.   * Lab (18 x 0.5)= 9 hrs.   Total = **72hrs.** | | * Continuous Assessments (CA) : **01 hr.** * Practical assessments (PA) : **01 hr.** | **152 hrs.** |
| **Course Aim/s.** | To provide sound knowledge of the principles and practices of digital systems, both at the device and circuit level. | | | | | | |
| **PLOs addressed by course** | **PLO1: Knowledge:** Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the degree.  **PLO2: Practical Knowledge and Application**. Demonstrate the competency to use the knowledge and practical skills appropriately.  **PLO3: Communication**: Demonstrate the competency in communicating efficiently and effectively to present information, ideas and concepts to the scientific community as well as to the wider society.  **PLO4: Individual Work, Team Work and Leadership**: Demonstrate the competency in working independently and in groups in addressing issues in multi-disciplinary environments and completing the tasks on time through collaborative learning while exhibiting leadership.  **PLO5: Creativity and Problem Solving:** Identify and analyze problems using quantitative and/or qualitative approaches using scientific methodology to provide valid conclusions.  **PLO8**: **Vision for Life:** Develop the capacity to project for future through identifying self-directed goals and continuously targeting towards them for self-improvement by undertaking further studies.  **PLO9: Lifelong Learning**: Develop the capacity to foresee new trends and their impacts and continuously update knowledge and develop skills willingly to meet those future challenges. | | | | | | |
| **Course Learning Outcomes (CLO)** | At the completion of this course student will be able to;  CLO1: Explain about Digital electronics, number systems, radix systems, Boolean algebra and logic, types of digital circuits, circuit implementation, and digital memory. (PLO1,PLO2)  CLO2: Understand types of digital circuits and how to compare them, Digital memory implementation and CPU. (PLO1, PLO2,PLO3, PLO4, PLO5)  CLO3: Explore about combinational circuits, types of circuits with how to implement them and the use in digital computer. (PLO1, PLO2,PLO3, PLO4, PLO5)  CLO4: Explore sequential circuits and differentiate between synchronous and asynchronous circuits. Discover how flip-flop works and implement the advanced circuits using flip- flops such as Shift registers and counters. (PLO1, PLO2,PLO3, PLO4, PLO5)  CLO5: Extend the knowledge to program using HDL.(PLO1)  CLO6: Apply the knowledge in simple projects in focus on research initiatives and individual projects. (PLO8, PLO9) | | | | | | |
| **Content**  **(Main topics, sub topics)** | Introduction to Digital Concepts, Number Systems and Binary Arithmetic, Binary Code and Other Codes, Logic Gates, Boolean algebra and Logic Simplification, Maxterms, Minterms - Canonical forms, Function of Combinational Logic, Combinational logic, Combinational Logic Circuits – Adders, Combinational Logic Circuits – Other Types of Circuits, Sequential Logic Basics, Sequential Circuits – Flip Flops, Types of Flip Flops, Shift Registers, Counters, Asynchronous Counters and Synchronous Counters, Asynchronous Sequential Circuits, Circuit Hazards, The Processor – CPU, Memory Organization, Digital Memory, Programmable Logic Devices – PLDs, Digital Integrated Circuits Techniques, Hardware Description Language – HDL, Digital System Projects using HDL | | | | | | |
| **Teaching Learning methods (TL)** | Self-learning/independent learning of self - study (IL)   * Learning the course contents in course materials in print and web-based materials (SS) * Learning through practical exercises & group work projects (PR) & (GP) * Additional reading materials/ recommended reading (RE)   Contact sessions   * Day schools (discussion sessions) (Non-compulsory) * Laboratory practical exercises (PR) (Non-compulsory) | | | | | | |
| **Assessment strategy** | Overall Continuous Assessment Mark (OCAM): 40% | | | | Final Assessment: 60 % | | |
| Details: Continuous Assessment (CA) : **01 hr.**  Practical Assessment (PA) : **01 hr.**    OCAM computation:  OCAM= 60% of best CA/PA + 40% of other CA/PA | | | | Final Evaluation  Theory: **02 hrs.** | | |
| **Recommended**  **Readings:** | 1. Jain, Floyd. 2015. *Digital Fundamentals*. India :Pearson 2. Mano M. 2012. *Digital Design India* : Pearson | | | | | | |