**The Islamia University of Bahawalpur**

**Bahawalnagar Campus**

**Course Plan**

**DEPARTMENT OF Computer Science and IT**

**Class: MCS-I Semester-1 Session: 2020-2022**

|  |  |  |  |
| --- | --- | --- | --- |
| **Instructor** | **Tabina Akhtar** | **Email:** | |
| **Course Title** | **Digital Logic &Design** | **Program** | **MCS** |
| **Course Code** |  | **Credit Hours** | **3** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Lecture** | | | **Wednesday and Thursday (9:30 am to 11:00 am)** | | | | | | | |
| **Course Objective:**  Digital logic & design is a core course in a typical undergraduate Computer Science Curriculum. The topics covered in the course are among the most fundamental material in all of computer science. The course prepares the students for (and is a prerequisite for) the more advanced material students will encounter in later courses. The course will cover well-known design to different circuits by using different logic gates also make able to understand the construction of different computer components circuits work. Three goals will be accomplished: (1) Implement logic gates (2) Number systems (3)Basic working of Circuits Diagrams  **Course Outcomes:**  At the End of this course you would be able to:   * Understand Digital computer Working. * Understand and use of Different Number Systems * Understand and implement of Logic Gates * Describe Different Method use in Boolean Algebraic Expressions * Know about Implement Different Logic Circuits | | | | | | | | | | |
| **Methods of Teaching**   * Assigned readings * Group activities & Discussion * Student-Directed Teaching | | | | | | | | | | |
| **Resource Material** | | | Books Prescribed: Digital Fundamentals By Thomas L. Floyd & Jain 11th Ed. | | | | | | | |
| **2.Reference Book** | | | |
|  | | | * Digital Design by Morris Mano 4th Ed. * Fundamental of Digital Logic with Verilog Design by Stephen & Zvonko 3rd Ed. | | | | |
| Ii | | | Handouts provided | | | | |
| **Web Resources** | | | | | | | |
| Web resources will be recommended time to time | | | | | | | |
| **Office Help Hours** | | | **Wednesday and Thursday (9:30 am to 11:00 am)** | | | | | | | |
| **Grading** | | | Exam \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Mid- Exam (30%) Final Exam (50%) Problem Session/Assignments (20%) | | | | | | | |
| **Problem Session** | | |  | | | | | | | |
| **SEQUENCE OF TOPICS TO BE COVERED** | | | | | | | | | | |
| Lecture Date | Session # | | | Topics (outline of main topics and sub topics) | | | | | Tutorial /Laboratory |
| **Week 1** | **1 & 2** | | | **Introduction of Digital computers**, signals types of signals, Characteristics of Signals (digital and analog quantities) **Number Systems** (briary, Octal, hexadecimal, decimal) conversion in different base | | | | | **Question & Answer Session/General**  **Discussion related to the Topic** |
| **Week 2** | **3 & 4** | | | **Arithmetic operation** with binary systems (add, sub, mult, divide) **Complements** in Number systems (1s and 2s compliments) | | | | |
| **Week 3** | **5 & 6** | | | **Subtraction** by using Complements, Gray code, BCD code.  **Introduction of Logic Gates** (AND, OR, NOT, NAND, NOR, X-or X- NOR) by using truth table for 2 inputs | | | | |
| **Week 4** | **7 & 8** | | | **Introductions of Circuits**  Introduction of Boolean Algebra  Laws and 12 Rules by using Gate implementation | | | | |  |
| **Week 5** | **9 & 10** | | | **Quiz** | | | | | **All Covered Topics** |
| **De ’Morgan Law** implementation with different  Boolean Expression Simplification by De ‘Morgan Law  **Expression Simplifications:** by using Boolean Rules. | | | | | **Question & Answer Session/General**  **Discussion related to the Topic** |
| **Week 6** | **11 & 12** | | | **SOP & POS** standards Forms  **SOP& POS Implementation:** Truth Table and Circuit diagram | | | | |
| **Week 7** | **13 &14** | | | **Conversion** of SOP &POS **K-Map introduction**.  2 &3 variable K-map implementation | | | | |
| **Week 8** | **15** | | | **4& 5 variable K-map implementation** | | | | |
| **Quiz** | | | | | **All Covered Chapters** |
| **Week 8** | **16** | | | **Course/Discussion**  **from session 1- 16** | | | | |  |
| **Mid Term Exam** | | | | | | | | | |
| **Week 9** | | **17 & 18** | | | **Combinational logic**  Half adders, Full adders, Binary Parallel adders with circuit diagram. | | | **Question & Answer Session/General**  **Discussion related to the Topic** | |
| **Week 10** | | **19 & 20** | | | Comparators, Encoder/Decoder truth table and Circuit diagram | | |
| **Week 11** | | **21 & 22** | | | **7-segment Decoder**  **Multiplexer/ De Multiplexer** with circuit | | |
| **Quiz** | | | **All Covered Chapters** | |
| **Week 12** | | **23 & 24** | | | **Flip Flops And Latch**  Difference B/w the latch and flip flop  Implementation of Different types of flip flop (S-R, D, J-K) with truth table | | | **Question& Answer Session/General**  **Discussion related to the Topic** | |
| **Week 13** | | **25 & 26** | | | **Counters:**  Asynchronous Counters  UP & Down Method  Synchronous Counters  Up & Down | | |
| **Week 14** | | **27 & 28** | | | **Registers:**  Shift Registers and its types | | |
| **Quiz** | | | **All Covered Chapters** | |
| **Week 15** | | **29 & 30** | | | **Memory:**  RAM, ROM  I/O operations | | | **Question& Answer Session/General**  **Discussion related to the Topic** | |
| **Week 16** | | **31** | | | **Presentations/Assignments** | | |  | |
| **32** | | | **Course/Discussion**  **from session 1- 32** | | |  | |
| **Final Term Paper** | | | | | | | | | |

**Student Evaluation criteria:**

|  |  |
| --- | --- |
| **Attendance** | **5%** |
| **Presentation / Assignments/Case study** | **5%** |
| **Surprise Test/Sudden Test , Quizzes** | **5%** |
| **Class Participation** | **5%** |
| **Mid Term Paper** | **30%** |
| **Final Term paper** | **50%** |
| **Total** | **100%** |

**Student Responsibilities**:

Students must attend their classes.  Failure to attend the class may result in failure in the course.  Students must also arrive on time and remain in the class for the entire period.  Cellular Phones and Beeper must be Turned off (Proper classroom decorum [behavior] adopts, Course outlines and calendars explain requirements and assignments, students are responsible for knowing what they say.  Students are also responsible for doing all assigned work on time. Excessive absences (more than 03) will result in “F Grade”. Students may prepare Sketchbook for taking notes and for references.

**Instructor/Tutor**

**Approved by:**

**Dean/ Chairman/ HOD/Subject Specialist/Program Coordinator**