Course Description Form

Description of the location

This course description provides a concise summary of the main features of the course and the learning outcomes expected of the student, demonstrating whether the student has made the most of the available learning opportunities . It . must be linked to the course description. The program

Shatt al-Arab Private University	1. Educational institution
Computer Science	2. / Scientific Department Center
logical design	3. Course name / code
My electronic presence	4. Available forms of attendance
15 weeks	5. Semester / Year
	6. Number of) study hours (total
29/7/2025	7. Date of preparation of this description

8. Course objectives

This course aims to provide students with a comprehensive understanding of the theoretical and practical foundations of digital logic design, including the analysis and design of combinational and sequential logic circuits . It also focuses on the skills of using Karnaugh maps, logical simplification, constructing . counters and registers, and understanding basic and combinational logic gates

Course outcomes, teaching, learning and assessment methods .9
A - Cognitive objectives The student should identify the different number systems and .1 . their transformations . The student should explain the basic principles of logic gates .2 The student simplifies logical expressions using Boolean .3 . algebra and Karnaugh maps ,The student analyzes combinational circuits such as collectors .4 . comparators, and multi-input switches The student should be able to distinguish between .5 . combinational and series circuits The student will explain the components of memory such as .6flip-flops . registers, and counters ,

B - Skill objectives

The student designs a combinational logic circuit using .1 . Karnaugh maps

The student converts a problem from a verbal description to a .2 . digital logic circuit

. The student models simple serial circuits .3

The student should use digital simulation tools .4(such as LogicWorks orProteus).

Teaching and learning methods

• . Theoretical lectures explained and supported by examples

• . Laboratory lessons using logical design software

• . Individual and group design projects

• . Homework containing analytical and design problems

• . Practical classroom discussions

Evaluation methods

Evaluation type	percentage
Quizzes	**10 %**
Homework	**10%**
Practical design project	**15%**
Practical report	**5%**
Midterm exam	**10%**
Final exam	**50%**

C - Emotional and value goals

1. The student should appreciate the importance of logical and systematic thinking in solving technical problems .

2. The student must demonstrate a commitment to accuracy and discipline when dealing with digital models and circuits .

3. The student must demonstrate a willingness to work in teams and cooperate effectively with his colleagues in design projects .

4. The student must have a spirit of innovation and perseverance in developing effective digital solutions .

5. The student must demonstrate responsible academic behavior in laboratories and classroom activities .

6. The student must adhere to ethical practices in the use of design and simulation tools .

Teaching and learning methods

1. : Interactive theoretical lectures
Presenting basic concepts in logical design using interactive examples and explanations, to enhance . theoretical understanding

2. : Practical laboratory sessions
Students are trained practically to build and analyze logic circuits using simulation tools(such asProteus or Logicly) . and to support the acquired technical skills ,

3. : Individual and group projects
Students are assigned to design miniature digital systems or integrated circuits, which enhances their . ability to think creatively and work collaboratively

4. : Classroom and extracurricular activities
Using analytical exercises and homework assignments to solve real-life problems, thus enhancing self-learning . and applied learning

5. : Presentations and Class Discussions
Encourage students to present and discuss their projects in front of their peers, which develops communication skills and the ability to defend design . solutions

6. : Use of electronic educational resources
Directing students to use digital tools, simulators, and interactive educational platforms to support learning . outside the classroom

Evaluation methods

1. Theory tests(short and final): are used to assess the student's understanding of basic concepts in number systems, Boolean algebra, circuit . simplification, and logic gate analysis

2. : Practical tests aim to measure the student’s ability to design and analyze logic circuits using digital simulation tools, and to verify the correctness of the circuit’s functional . performance

3. : Homework and analytical assignments These include problems of designing and analyzing logic circuits, and encourage the student to use theoretical concepts to solve real-world technical . problems

4. : Group or Individual Projects Students are assigned complete design projects for a digital circuit, measuring design skills, innovation, and . collaborative work

5. : Technical Reports Students are required to prepare reports documenting ,the steps in designing and analyzing a particular circuit which assesses technical writing and systematic . analysis skills

6. : Classroom monitoring and active participation The student’s interaction and participation in class ,discussions and group activities are monitored reflecting his commitment and appreciation for the . subject

7. : Project Presentations The student is evaluated on his or her ability to present and explain his or her design technically to a committee or peers, enhancing technical communication and .critical thinking

D - General and transferable skills (other skills related to .(employability and personal development

1. Basic computer and office technology skills
    - Microsoft Office applications (Word, Excel, PowerPoint .etc ,) which is a basic requirement for , . most administrative and educational jobs
2. Organizational and time management skills
    - By adhering to deadlines for assignments and projects . and working on multiple tasks efficiently
3. Digital research and analysis skills
    - ,Ability to research technical information, analyze data and write source-supported technical . reports
4. Teamwork and effective communication skills
    - Interact within collaborative working groups, contribute to presentations or implement joint projects .

Course structure .10

week	the topic	Learning outcomes	Type of learning
1	Number systems and conversion between them	**LO1**	a lecture
2	Boolean algebra and logic gates	**LO2**	Lecture+ Lab

3	Simplifying circuits using Karnaugh maps	**LO3**	Lecture+ Application
4	Combinational Circuit Analysis and Design	**LO4**	a lecture
5	First short test	**LO1, LO2**	a test
6	Half and full mosque design and comparisons	**LO4**	Lecture+ Lab
7	Midterm exam	**LO1 – LO4**	a test
8	Sequential Circuit Concepts– **Flip-Flops**	**LO5, LO6**	a lecture
9	Design of registers and meters	**LO6**	Lecture+ Lab
10	Second short test	**LO6**	a test
11	Applications of ring counters and synchronization	**LO6**	a lecture
12	Digital Integrated Circuit Design Project	**LO3 – LO6**	project
13	Project report writing and analysis	**LO3 – LO6**	a report
14	General review	All**LO**	review
15	Final exam	All**LO**	a test

Infrastructure .11	
M. Morris Mano, Digital Logic and Computer Design, Pearson.	Required textbooks -1
• Floyd, T. L. (2014). Digital Fundamentals, 11th Edition, Pearson.	Main references (sources) -2
	A) Recommended books and , references (scientific journals (.reports , etc
• https://www.tinkercad.com • https://www.electronics-tutorials.ws • Logic Circuit Simulator Pro – https://logic.ly	, b) Electronic references .websites , etc

Curriculum Development Plan .12
The development of the logic design curriculum includes updating simulation tools and using active learning techniques(such as project-based learning) , incorporating models of modern digital systems, and encouraging students to useVHDL orVerilog programming as a step toward advanced digital design. Emphasis will also be placed on collaborative projects and digital circuit documentation skills to bring theoretical concepts closer to practical applications.

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