



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
2026- 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	L01	a lecture
2	Boolean algebra and logic gates	L02	Lecture+ Lab

3	Simplifying circuits using Karnaugh maps	L03	Lecture+ Application
4	Combinational Circuit Analysis and Design	L04	a lecture
5	First short test	L01, L02	a test
6	Half and full mosque design and comparisons	L04	Lecture+ Lab
7	Midterm exam	L01 - L04	a test
8	Sequential Circuit Concepts- Flip-Flops	L05, L06	a lecture
9	Design of registers and meters	L06	Lecture+ Lab
10	Second short test	L06	a test
11	Applications of ring counters and synchronization	L06	a lecture
12	Digital Integrated Circuit Design Project	L03 - L06	project
13	Project report writing and analysis	L03 - L06	a report
14	General review	AllLO	review
15	Final exam	AllLO	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.

 عميد الكلية	 رئيس القسم	 مدرس المادة
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