ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications
(CS)

Course Specifications

Institution: Najran University	Date of Report 20/4/1436
College/Department : College of Science and Arts Sharorah Department : Department of Computer Science	

A. Course Identification and General Information

1. Course title and code:
   Title: Digital logic Design Code: 302ENG -4 (٣٠٢هند-٤)
2. Credit hours : 4(3+1)
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
   - B.Sc. program in Computer Science
4. Name of faculty member responsible for the course
   - Dr/ Abdulaziz Saleh Yselem Bin-Habtoor
5. Level/year at which this course is offered:
   - Level 4 Second year
6. Pre-requisites for this course (if any)
   - None
7. Co-requisites for this course (if any)
   - None
8. Location if not on main campus
   - Main Campus and Female Branch: College of Science and Arts, Border District-King Abdul Aziz Road, Sharourah
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	√	What percentage?	100%
b. Blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

We still teach this course using traditional methods but there is a plan to transform all course into electronic format using E-learning

B Objectives

1. What is the main purpose for this course? ▪ Study the fundamentals of digital systems, Boolean algebra, and logic expressions. ▪ Simplify and implement Boolean functions using elementary logic gates. ▪ Study the combinational and sequential digital circuits. ▪ Design of combinational and sequential logic circuits. ▪ Study briefly the programmable logic devices.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

Boolean Algebra and Logic Gates. Gate-Level Minimization: Karnaugh Map, Sum of Product and Product of Sum Simplification. Combinational Logic: Design Procedure, Adder, subtractor, Incrementor-Decrementor, Magnitude Comparators, Decoder, Encoder, Multiplexer and De Multiplexer. Sequential Logic : RS, D, JK Flip-Flops, ad T Flip-Flops. Registers and Counters: Registers, Shift registers, Asynchronous and Synchronous Counters. Memory and Programmable logic: Memory Decoding , Error Detection and Correction, Read-Only Memory, Programmable Logic Array, Programmable Array Logic

1. Topics to be Covered :

List of Topics	No. of Weeks	Contact Hours
Boolean Algebra and Logic Gates Definition of Boolean Algebra: Basic Theorems and properties of Boolean Algebra, Canonical and Standard Forms, Basic Gates (NOT, AND, OR). NAND,NOR, X-OR and X-NOR. Boolean Functions, Digital Logic gates. Integrated Circuits	2	6
Gate-Level Minimization The Map Method : Karnaugh Map. Sum of Product Simplification. Product of Sum Simplification. Don't-Care Conditions. NAND and NOR Implementation	1+1/3	4
Combinational Logic Analysis Procedure, Design Procedure. Half Adder, Full Adder, Half subtractor, Full subtractor. Binary Adder-Substractor **.** Incrementor-Decrementor . Binary Multiplier . Magnitude Comparators**.** Decoder . Encoder .Multiplexer. DeMultiplexer	4+1/3	13
Mid-term Exam	1/3	1

Sequential Logic Sequential Circuits . Storage Elements: Latches RS Flip-Flops. D Flip-Flops, JK Flip-Flops, T Flip-Flops. Clocked Sequential Circuits	2+1/3	7
Registers and Counters Registers . Shift registers. Asynchronous (Ripple) Counters . Synchronous Counters	2+1/3	7
Memory and Programmable logic Random-Access Memory . Memory Decoding . Error Detection and Correction . Read-Only Memory . Programmable Logic Array . Programmable Array Logic	2+1/3	7

1. Topics to be Covered :

List of Topics	**No. of Weeks**	**Contact Hours**
Introduction to EWB and Multisim simulators	1	2
AND, OR, NOT, NAND, NOR, XOR, and XNOR gates	1	2
Boolean functions simplification using Boolean Algebra using NAND, NOR implementation	1	2
Gate level minimization using K-map using NAND, NOR implementation	1	2
Half Adder, Full Adder,	1	2
Half subtractor, Full subtractor, Binary Adder-Subtractor, BCD Adder	2	4
Decoders, Encoders, Implementations of Boolean functions using decoders	1	2
Mid term test	1	2
Multiplexer and Demultiplexer: Implementations of Boolean functions using MUX.	1	2
RS, D, and JK Flip Flops	1	2
Registers: Shift left and shift right	1	2
Asynchronous (Ripple) Counters	1	2
Synchronous Counters	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	45	-	30	-	-	75
Credit	45	-	15	-	-	60

3. Additional private study/learning hours expected for students per week. 4 Office Hours
This should be an average: for the semester not a specific requirement in each week

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The **National Qualification Framework** provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.
Every course is not required to include learning outcomes from each domain.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Memorize principles, concepts and knowledge in the field of digital logic	▪ Lectures ▪ Problem Solving ▪ Assignments.	▪ Written tests and final examinations ▪ Evaluate the assignments
1.2	Retrieve adequate theoretical background for the development of knowledge in computer components and evolution.		
2.0	**Cognitive Skills**		
2.1	Reconstruct the logical thinking and independent creativity in the design of logic circuits.	▪ Problem Solving ▪ Practical lab application. ▪ discussion	▪ Solution of Exercises of the Text book ▪ Mid and final exams ▪ Evaluate the Assignments
2.2	Design the existing circuits used in the computer and use appropriate programming language to meet the requirements in the area of specialization		
2.3	Apply the experiments, then explain and analyze the results and find appropriate solutions in the area of specialization		
3.0	**Interpersonal Skills & Responsibility**		
3.1	▪		
4.0	**Communication, Information Technology, Numerical**		
4.1	Use the Boolean algebra to simplify expressions and implement them using logic	Problem Solving	▪ Problem Solving

	gates.		
4.2			
5.0	**Psychomotor**		
5.1	non	no n	Non

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
Psychomotor	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct

Suggested ***verbs not to use*** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam	8th week	15
2	Practical midterm Exam	8th week	10
3	Alternative methods ▪ Individual and group assignments ▪ Short tests (Quizzes)	Over the semester	15
4	Attendance and participation	Over the semester	10
5	Final Practical Exam	13th week	10
6	Final written Exam	Semester end	40
			100%

D. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) 4 **Office hours**

E. Learning Resources

1. List Required Textbooks

▪ M. Morris Mano, "Digital Design", Pearson Education, 4ht edition
2. List Essential References Materials (Journals, Reports, etc.) ▪ Stephen Browen and Zvonk Vranesic "Fundamentals Of Digital Logic with VHDL design " 2nd edition , university of Toronto , Canada. ▪ M. Rafiquzzaman, "Fundamentals Of Digital Logic And Microcomputer Design," , 5th Edition, 2005, Wiley-Interscience Isbn 0471727849. ▪ Parag K. Lala, "Principles Of Modern Digital Design", Chair Of Electrical Engineering Texas A&M University–Texarkana.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) ▪ M. M. Mano, Digital Logic and Computer Design, PHI. ▪ M.M.Mano, Computer System Architecture, PHI.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) ▪ The Classrooms, laboratories size have to be suitable to accommodate all the students enrolled in the course

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ halls have to be equipped with a data display (data show)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) ▪ identify laboratory equipment required depending on the selected topics

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: ✓ Distribution of a questionnaire for students to know how to achieve the goals in the theoretical and practical side.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor: ✓ Discussions with colleagues who specialize in teaching methods and means of learning. ✓ Self-evaluation of the performance of the teacher. ✓ Discussions with other colleagues who taught this course.
3 Processes for Improvement of Teaching ✓ Diagnose weaknesses and turn them into strengths. ✓ Discussions about the decision and methods of teaching ✓ Study the needs of the labor market of college graduates

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Faculty or Teaching Staff: Dr. Abdulaziz saleh Yselem Bin-Habtoor

Signature: _____ **Date Report Completed: 20 / 3 / 1436**

Received by: _____ **Dean/Department Head**

Signature: _____ **Date: 20 / 3 / 1436**