



# **COURSE SPECIFICATIONS (CS)**

Najran University  
College of Computer Science and Information Systems  
Department of Computer Science

**Course Name:** Computer Organization and Architecture  
**Course Code:** 222CSS-4

**Prepared By:**

**MD. SELIM REZA**

**August 2017**

|                    |   |                 |             |
|--------------------|---|-----------------|-------------|
| Institution        | Najran University   | Date of Report: | August 2017 |
| College/Department | College of Computer Science and Information systems, Department of Computer Science |                 |             |

## A. Course Identification and General Information

|  |                                     |                  |                          |
|--|-------------------------------------|------------------|--------------------------|
| 1. Course title and code: : <b>Computer Organization and Architecture 222CSS-4</b>   |                                     |                  |                          |
| 2. Credit hours: 4   |                                     |                  |                          |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br>This course is required for Computer Science program  |                                     |                  |                          |
| 4. Name of faculty member responsible for the course: Md. Selim Reza   |                                     |                  |                          |
| 5. Level/year at which this course is offered : Level 5  |                                     |                  |                          |
| 6. Pre-requisites for this course (if any): No   |                                     |                  |                          |
| 7. Co-requisites for this course (if any)  |                                     |                  |                          |
| 8. Location if not on main campus<br>Offered at Main Campus of the College for boys, and side campus for girls   |                                     |                  |                          |
| 9. Mode of Instruction (mark all that apply)   |                                     |                  |                          |
| a. Traditional classroom   | <input type="checkbox"/>            | What percentage? | <input type="checkbox"/> |
| b. Blended (traditional and online)  | <input checked="" type="checkbox"/> | What percentage? | 100%                     |
| c. E-learning  | <input type="checkbox"/>            | What percentage? | <input type="checkbox"/> |
| d. Correspondence  | <input type="checkbox"/>            | What percentage? | <input type="checkbox"/> |
| f. Other   | <input type="checkbox"/>            | What percentage? | <input type="checkbox"/> |
| Comments:<br>Mainly following teaching strategies are used under traditional classroom: <ul style="list-style-type: none"> <li>• Showing and delivering PPT presentation in the class.</li> <li>• Solving scheduling algorithms on white board to explain the solution in more detail.</li> <li>• Motivating students to be active during class by asking questions regularly.</li> <li>• Lecturers will also be delivered through virtual class for online students.</li> <li>• Lectures will also be recorded during virtual class using Echo System and uploaded on blackboard, so students can see the video lectures any time to get explanation of topic.</li> </ul> |                                     |                  |                          |

## B Objectives

|  |
|--|
| 1. What is the main purpose for this course?   |
| <ul style="list-style-type: none"> <li>Describe the basic processing units of computer.</li> <li>Recognize the current architecture of computer systems (data representation, performance enhancement, CPU, memory hierarchy design, I/O design).</li> <li>Discuss the latest technology in computer science with modern Architecture.</li> <li>Apply conversion formula among different number systems used in digital computers.</li> <li>Analyze differences of instruction set architectures and addressing modes.</li> </ul>  |
| 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)  |
| <ul style="list-style-type: none"> <li>Teaching using multimedia presentation along with text and reference books.</li> <li>Conducting active participation of students during class by question/answer session using the board with detailed explanation.</li> <li>Contents, course learning outcomes (CLO) and CLO mapping with student outcomes are reviewed and revised after every two years.</li> <li>In this semester virtual class will also be arranged for online students.</li> <li>Video lecturer will also be available for students through blackboard.</li> </ul> |

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

|   |              |               |
|---|--------------|---------------|
| 1. Topics to be Covered   |              |               |
| List of Topics  | No. of Weeks | Contact Hours |
| Computer structure and computer functions   | 1            | 6             |
| Performance assessment, Instruction execution, MIPS   | 1            | 5             |
| Interconnection structure, Memory module, I/O Module, Bus structure, Bus type, Bus arbitration.                       | 1            | 6             |
| Basic of computer component architecture (Digital gates, Boolean expressions, circuit simplification.)                | 1            | 6             |
| Basic ALU architecture and components ( Combinational circuits, Half adder, full adder)                               | 1            | 6             |
| Number Systems (decimal, hexadecimal and binary) and their basic conversions.   | 1            | 5             |
| Unsigned and signed Integer representation, integer arithmetic.   | 1            | 6             |
| Introduction to computer organization; Basic computer components: processor, memory, bus, input and output devices.   | 1            | 6             |
| Timing and control, Basic fetch-execution cycle of instructions. The internal organization of the Intel x86-based PCs | 1            | 5             |
| Digital Logic: Boolean Algebra, Logic Gate, and Circuits  | 1            | 5             |

|   |   |   |
|---|---|---|
| Assembly language concepts: Assembly language program structure: statements, directives; Instruction formats, op-codes and operands | 1 | 5 |
| Memory segmentation: logical and physical addresses; Addressing modes   | 1 | 5 |
| Data movement instructions; arithmetic instructions and flags   | 1 | 5 |
| Logical and bit manipulation operations; Compare, jump, Conditional statements and loop instructions                                | 2 | 5 |
|   |   |   |

|  |         |          |            |           |        |       |
|--|---------|----------|------------|-----------|--------|-------|
| 2. Course components (total contact hours and credits per semester): |         |          |            |           |        |       |
|  | Lecture | Tutorial | Laboratory | Practical | Other: | Total |
| Contact Hours  | 45      | 6        | 30         | 0         | 0      | 81    |
| Credit   | 3       | 0        | 1          | 0         | 0      | 4     |

|  |   |
|--|---|
| 3. Additional private study/learning hours expected for students per week. | 3 |
|--|---|

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| 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<br>And Course Learning Outcomes   | Course Teaching<br>Strategies  | Course Assessment<br>Methods  |
|------------|--|--|---|
| <b>1.0</b> | <b>Knowledge</b>   |  |   |
| 1.1        | Recognize the current architecture of computer systems (data representation, performance enhancement, CPU, memory hierarchy design, I/O design). | <p>TS-1: Relate Course Learning Outcomes (CLOs) to the topics</p> <p>TS-2: Lectures: using PPT presentation to address verbally in front of students the concepts associated with examples with taking help of writing on the board as needed.</p> <p>TS-3: E-learning: Video lectures will be uploaded for students, so they can recover the topics which they miss during regular class.</p> <p>TS-4: Virtual Class: Students can also attend the lecture from home in case of leave.</p> <p>TS5: Assignment: Students can also know the latest technology in computer science with modern Architecture</p> <p>TS-6: Motivating Student: Motivating students to be active during class by asking questions regularly during lecture and giving them assignments to enforce the students to work in home, to search data from internet and to read related reference books</p> <p>TS-7: Recall the topics of last lecture and the critical issues based on different topics, which certainly helps students to recall memory frequently and store that topic in their memory for long term.</p> | <ul style="list-style-type: none"> <li>➤ Final written exam.</li> <li>➤ Assignment</li> <li>➤ Midterm Exam</li> </ul> |
| 1.2        | Describe the basic processing units of computer.   |  |   |
| 1.3        | Discuss the latest technology in computer science with modern Architecture.  |  |   |

|            |  |   |   |
|------------|--|---|---|
|            |  |   |   |
| <b>2.0</b> | <b>Cognitive Skills</b>  |   |   |
| 2.1        | Analyze differences of instruction set architectures and addressing modes          | TS-1: Relate Course Learning Outcomes (CLOs) to the topics  | <ul style="list-style-type: none"> <li>➤ Final written exam.</li> <li>➤ Lab Final exam</li> <li>➤ Midterm Exam</li> </ul> |
| 2.2        | Apply conversion formula among different number systems used in digital computers. | <p>TS-2: Lectures: using PPT presentation to address verbally in front of students the concepts associated with examples with taking help of writing on the board as needed.</p> <p>TS-3: E-learning: Video lectures will be uploaded for students, so they can recover the topics which they miss during regular class.</p> <p>TS-4: Virtual Class: Students can also attend the lecture from home in case of leave.</p> <p>TS-5: Motivating Student: Motivating students to be active during class by asking questions regularly during lecture and giving them assignments to enforce the students to work in home, to search data from internet and to read related reference books</p> <p>TS-6: Recall the topics of last lecture and the critical issues based on different topics, which certainly helps students to recall memory frequently and store that topic in their memory for long term.</p> <p>TS-7: Cooperative Learning: Let students to solve conversion formula among different number systems in small groups and giving correction on their solution during class.</p> |   |
| <b>3.0</b> | <b>Interpersonal Skills &amp; Responsibility</b><br>N/A                            |   |   |

|            |  |   |   |
|------------|--|---|---|
| 3.1        |  |   |   |
| 3.2        |  |   |   |
| <b>4.0</b> | <b>Communication, Information Technology, Numerical</b>                            |   |   |
| 4.1        | Apply conversion formula among different number systems used in digital computers. | <p>TS-1: Relate Course Learning Outcomes (CLOs) to the topics</p> <p>TS-2: Lectures: using PPT presentation to address verbally in front of students the concepts associated with examples with taking help of writing on the board as needed.</p> <p>TS-3: E-learning: Video lectures will be uploaded for students, so they can recover the topics which they miss during regular class.</p> <p>TS-4: Virtual Class: Students can also attend the lecture from home in case of leave.</p> <p>TS-5: Motivating Student: Motivating students to be active during class by asking questions regularly during lecture and giving them assignments to enforce the students to work in home, to search data from internet and to read related reference books</p> <p>TS-6: Recall the topics of last lecture and the critical issues based on different topics, which certainly helps students to recall memory frequently and store that topic in their memory for long term.</p> <p>TS-7: Cooperative Learning: Let students to solve conversion formula among different number systems in small groups and giving correction on their solution during class.</p> | <p>➤ Final Written Exam</p> <p>➤ Midterm Exam</p> |
| 4.2        |  |   |   |
| <b>5.0</b> | <b>Psychomotor</b>   |   |   |

|     |     |  |  |
|-----|-----|--|--|
|     | N/A |  |  |
| 5.1 |     |  |  |
| 5.2 |     |  |  |

### Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

| NQF Learning Domains                                    | Suggested Verbs  |
|---|--|
| <b>Knowledge</b>  | list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write   |
| <b>Cognitive Skills</b>                                 | 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 |
| <b>Interpersonal Skills &amp; Responsibility</b>        | demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write   |
| <b>Communication, Information Technology, Numerical</b> | demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize  |
| <b>Psychomotor</b>                                      | 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  | Quizzes   | 4,9      | 10                             |
| 2  | Midterm Examinations  | 6,11     | 30                             |
| 3  | Final Examination   | 15       | 40                             |
| 4  | Final Lab Test  | 14       | 10                             |
| 5  | Assignments and Lab Performances  | 2-13     | 10                             |
| 6  |   |          |                                |
| 7  |   |          |                                |
| 8  |   |          |                                |

#### D. Student Academic Counseling and Support

1. 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)
  - During the whole semester 10 hours/week are reserve for students to guide them, to help them, to explain them topic which are not clear for them etc.
  - Academic advisors are assigned to advise and support students.
  - Instructors arrange and provide tutorials to students.

#### E. Learning Resources

1. List Required Textbooks  
Kip R. Irvine, Assembly Language for Intel-Based Computers, Pearson Education, Inc, Latest Edition.  
William Stalling, Computer Organization and Architecture: Designing for Performance.
2. List Essential References Materials (Journals, Reports, etc.)  
M Morris Mano, Computer System Architecture, Third Edition, Prentice Hall.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)  
Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw Hill, 5<sup>th</sup> Edition, ISBN 7-111-10-346-7
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.

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## 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.) 30

2. Computing resources (AV, data show, Smart Board, software, etc.) 20 PC

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

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## G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Online course survey: By the end of each semester, students give their opinions about many factors in the course. They give feedback about the teaching strategies, assessment methods, textbooks, instructor, etc.
- Feedback about Course Learning Outcomes (CLOs): A course survey is distributed to students to take their opinions about the CLOs.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- Assistance from colleagues.
- Independent assessment of standard achieved by students.

3 Processes for Improvement of Teaching

- Relate CLOs to assessment methods and teaching strategies
- Describe the relationships between the course's topics and CLOs.
- Course syllabus must be distributed in the first week. It should contain the necessary information about the course (CLOs, assessment methods, descriptions, etc.)
- Implement the improvement plan of previous semester.
- Encourage students to attend tutorials and to benefit from office hours.
- Contact lab instructor to make sure that the theory is consistent with the lab materials.

|   |
|---|
| <ul style="list-style-type: none"> <li>Note down the problem that face during class and try to solve those problems by discussing senior faculty members</li> <li>➤ Learning best teaching methods from the best teacher amongst all faculty members.</li> </ul>  |
| <p>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)</p> <ul style="list-style-type: none"> <li>Course coordinator checks all exams and make sure that they are related to CLOs and appropriate for the course.</li> <li>By the end of the semester, the curriculum committee review all courses and approve actions to be taken in the subsequent semester.</li> <li>The vice dean and the dean of the college have to review and approve the final grades.</li> <li>A list of staff members have to check the grades of each one of the students in all exams.</li> </ul> |
| <p>5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>Each instructor has to teach the course according to the previous course materials and improvement plans.</li> <li>By the end of each semester, a course file containing all activities and samples must be prepared and submitted to the college.</li> <li>Evaluation of CLOs can be used to compare the improvement from previous evaluation.</li> <li>Improvement plan based on the online course survey must be prepared.</li> <li>Action plan based on the CLOs achievements must be prepared.</li> </ul>  |

Name of Course Instructor: **Md. Selim Reza**

Signature: \_\_\_\_\_ Date Specification Completed: August 2017

Program Coordinator: Dr. Abdulrahman Thaqfan

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

