



Course Specifications

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| Institution: | Majmaah University |
| Academic Department : | College of Science in Zulfi, Department of Computer Science and Information. |
| Programme : | Computer Science and Information |
| Course : | Computer Organization and Assembly Language |
| Course Coordinator : | Dr. Hammad Quraishi |
| Programme Coordinator : | Associate Prof. Yosry Azza. |
| Course Specification Approved Date : | 23 / 12 / 1435 H |



A. Course Identification and General Information

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|---|--|-------------|
| 1 - Course title : Computer Organization and Assembly Language | Course Code: CSI 313 | |
| 2. Credit hours : 3 (2+2) | | |
| 3 - Program(s) in which the course is offered: Computer Science & Information | | |
| 4 – Course Language : English | | |
| 5 - Name of faculty member responsible for the course: Dr. Hammad Quraishi | | |
| 6 - Level/year at which this course is offered : 5 th | | |
| 7 - Pre-requisites for this course (if any) : • CSI 223 | | |
| 8 - Co-requisites for this course (if any) : None | | |
| 9 - Location if not on main campus : (College of Science in Zulfi) | | |
| 10 - Mode of Instruction (mark all that apply) | | |
| A - Traditional classroom | <input checked="" type="checkbox"/> What percentage? | 80% |
| B - Blended (traditional and online) | <input checked="" type="checkbox"/> What percentage? | 10 % |
| D - e-learning | <input type="checkbox"/> What percentage? | % |
| E - Correspondence | <input type="checkbox"/> What percentage? | % |
| F - Other | <input checked="" type="checkbox"/> What percentage? | 10 % |
| Comments : | | |
| One-tenth of the course is presented mainly inside video lectures of other instructors worldwide. They illustrate the same topics that I introduced in my lectures with a different presentation. | | |

B. Objectives

What is the main purpose for this course?

The goal of this course is to introduce topics related to the organization and operation of computers. Topics include the main components of computers (central processing unit, primary and secondary memory, common peripheral devices, and computer communications hardware), data representation in computer systems, simple computer design, cache memory, programming in assembly language, and input/output and storage systems. Also featured is an overview of parallel architectures.

Students will:

- Develop a basic understanding of computer system organization,





- Learn to program computer systems at the machine and assembly levels,
- Understand what roles are carried out by the microarchitecture, data flow and control flow portions of computers,
- Understand how a high level language is translated from text, to assembly, to machine language, and
- Learn how I/O devices are controlled by microprocessors.

Briefly describe any plans for developing and improving the course that are being implemented :

1. Using group discussion through the internet with students attending the course.
2. Updating the materials of the course to cover the new topics of the field.

C. Course Description

1. Topics to be covered

| List of Topics | No. of Weeks | Contact Hours |
|--|--------------|---------------|
| 1. Introduction to Computer Systems Organization The Main Components of a Computer, Standards Organizations, Evolution of Computers, The von Neumann Model, Non-von Neumann Models. Lab Work: Introduction to Assembly Language and Simulator. | 2 | 8 |
| 2. Data Representation in Computer Systems Positional Numbering Systems, Decimal to Binary Conversions, Signed Integer Representation, Floating-Point Representation, Character Codes, Codes for Data Recording and Transmission, Error Detection and Correction. Lab Work: Variable storage in registers and memory using various representations. Performing Simple Arithmetic and Logic Operations. | 2 | 8 |
| 3. An Introduction to a Simple Computer CPU Basics and Organization, The Bus, Clocks, The Input/Output Subsystem, Memory Organization and Addressing, Interrupts, Registers and Buses, The Instruction Set Architecture, Register Transfer Notation, Instruction Processing, A Simple Program, Real-World Examples of Computer Architectures. Lab Work: Implementing Loops and Introduction to Hardware and Software Interrupts. String and Stack Operations. | 4 | 16 |
| 4. Cache and Main Memory Types of Memory, The Memory Hierarchy, Cache Memory, Virtual | 3 | 12 |





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|---|----------|-----------|
| Memory, A Real-World Example of Memory Management. Lab Work: Moving data from Main Memory to Cache and Registers and vice versa. Using Procedures and Parameter Passing. | | |
| 5. Input/ Output and Storage Systems Amdahl's Law, I/O Architectures (I/O Control Methods, I/O Bus Operation, Interrupt-Driven I/O), Magnetic Disk Technology, Optical Disks, Magnetic Tape, RAID, Data Compression. Lab Work: Input/ Output using Assembly and Performing more Arithmetic and Logic Operations. | 4 | 16 |

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

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

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

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The private self-study of my student is crucial for this course. It includes:

- reading carefully the topics in the textbook or reference book,
- browsing the websites that are concerned with the course,
- solving the exercises that are assigned in each chapter,
- discussing the course topics with the instructor in his office hours,
- watching the video lectures of other instructors who presented related topics worldwide.

The total workload of the student in this course is then: $60 + 5 * 15 = 135$ work hours.





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

| | NQF Learning Domains And Course Learning Outcomes | Course Teaching Strategies | Course Assessment Methods |
|------------|---|--|---|
| 1.0 | Knowledge | | |
| 1.1 | Understand the major blocks of a computing system and how they interact to perform a specific task. | Lectures Lab | Written Exam Homework |
| 1.2 | Express an understanding of the development and evolution of computers over time. | demonstrations Case studies | assignments Lab assignments |
| 1.3 | Understand how information is represented and stored in a computer and how it is processed. | Individual presentations | Class Activities Quizzes |
| 2.0 | Cognitive Skills | | |
| 2.1 | Show an understanding of how different functions of a computer are performed using different sub-components. | Lectures Lab | Written Exam Homework |
| 2.2 | Writing assembly programs for different application. | demonstrations Case studies Individual presentations Brainstorming | assignments Lab assignments Class Activities Quizzes |
| 3.0 | Interpersonal Skills & Responsibility | | |
| 3.1 | Work in a group and learn time management. | Small group | Written Exam |
| 3.2 | Learn how to search for information through library and internet. | discussion Whole group | Homework assignments |
| 3.3 | Present a short report in a written form and orally using appropriate scientific language. | discussion Brainstorming Presentation | Lab assignments Class Activities Quizzes |
| 4.0 | Communication, Information Technology, Numerical | | |
| 4.1 | Communicate with teacher, ask questions, solve problems, and use computers. | Small group discussion | Written Exam Homework |
| 4.2 | Use Information technology and computer skills to gather information about a selected topic. | Whole group discussion | assignments Lab assignments |
| 4.3 | Operate questions during the lecture, work in groups, and communicate with each other and with me electronically, and periodically visit the sites I recommended. | Brainstorming Presentation | Class Activities Quizzes |
| 5.0 | Psychomotor | | |
| 5.1 | ..... | ..... | ..... |
| 5.2 | ..... | ..... | ..... |
| 5.3 | ..... | ..... | ..... |





5. Schedule of Assessment Tasks for Students during the Semester:

| | Assessment task | Week Due | Proportion of Total Assessment |
|---|--|---------------------|--------------------------------|
| 1 | First written mid-term exam | 6 | 15% |
| 2 | Second written mid-term exam | 12 | 15% |
| 3 | Presentation, class activities, and group discussion | Every week | 5% |
| 4 | Homework assignments | After Every chapter | 5% |
| 5 | Practical exam | 15 | 20% |
| 6 | Final written exam | 16 | 40% |
| 7 | Total | | 100% |

D. Student Academic Counseling and Support

1. six office hours per week in the lecturer schedule.
2. The contact with students by e-mail, mobile, office telephone and website.

E. Learning Resources

1. List Required Textbooks :

- Linda Null, Julia Lobur, “The essentials of computer organization and architecture”, Jones and Bartlett Publishers, Inc., 2012

2. List Essential References Materials :

- William Stallings, Computer Organization and Architecture: Designing for Performance, 9th Edition, Prentice Hall, 2012.
- Kip Irvine, Assembly Language for x86 Processors, 7th Edition, Prentice Hall, March 2014.

3. List Recommended Textbooks and Reference Material :

None

4. List Electronic Materials :

<https://www.coursera.org/>.

5. Other learning material :

Videos and presentations made available on D2L e-Learning platform.





F. Facilities Required

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|---|
| 1. Accommodation <ul style="list-style-type: none">• Class Rooms• Computer Labs• Library |
| 2. Computing resources <ul style="list-style-type: none">• Smart Board• Computing machines |
| 3. Other resources <p>None</p> |

G. Course Evaluation and Improvement Processes

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| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: <ul style="list-style-type: none">• Analysis of students' results.• Observation during class work.• Students' evaluations.• Colleagues' evaluations.• Evaluation questionnaire filled by the students.• Interview a sample of students enrolled in the course to solicit their opinions. |
| 2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor : <ul style="list-style-type: none">• Self-assessment.• External evaluation.• Periodic review of course (the Commission of study plans). |
| 3 Processes for Improvement of Teaching : <ul style="list-style-type: none">• Taking into account the recommendations yielded from the internal review of the course.• Guidelines about teaching the course provided by the study plans commission.• Department guidelines pertaining the faculty member's performance acquired using direct observation.• Training and development.• Workshops to improve the educational process. |
| 4. Processes for Verifying Standards of Student Achievement <p>Instructors of the course working together with Head of Department to adopt a unique process of the evaluation.</p> |





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

- Comparison of the course to its counterparts offered in similar departments.
- Periodic revision of course description by faculty member.
- Periodic revision of course description by the study plans and schedules Commission.
- Update learning resources related to the course to ensure that the course is up-to-date with the developments in the field.
- Make use of statistical analysis of course evaluation carried out by the students to improve and develop the course.
- Provide an opportunity to the students to express their opinions about what is taught and receive suggestions and evaluate their effectiveness.

Course Specification Approved

Department Official Meeting No (6) Date 23 / 12 / 1435 H

Course's Coordinator

Name : Dr. Hammad Quraishi

Signature :

Date : 23 / 12 / 1435 H

Department Head

Name : Associate Prof. Yosry Azzam

Signature : 

Date : ... / ... / H

