Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

14034212-3 Advanced Computer Architecture

Course Specification

Institution	**Umm Al-Qura University**
College/Department	**College of Computer & Information Systems**

A Course Identification and General Information

1. Course title and code: **Advanced Computer Architecture 14034212-3**
2. Credit hours   **3**
3. Program(s) in which the course is offered.   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course   **Dr. Muhammad Rashid**
5. Level/year at which this course is offered   **Level 9 - 10 / Year 5**
6. Pre-requisites for this course (if any)   **Computer Organization & Architecture**
7. Co-requisites for this course (if any)
8. Location if not on main campus   **Al-Abidiyah Umm Al Qura University - Makkah Al Mukarramah**

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Fundamentals of Instruction-set architecture and its implementation, Out-of-order execution, Instruction level parallelism, Multiprocessing, Data and thread level parallelism

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

1. Involving students in presentation of advance topics in computer architecture to know current research in the field.

2. Lecture slides and tutorials

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
Emerging trends in computer architecture	1	3
Classification of instruction-set architectures (RISC versus CISC)	2	6
Review of MIPS 5-stage pipeline (with and without pipelining)	2	6
Extending the pipeline to handle multi-cycle operations (out-of-order execution)	1	3
Static(compiler) and dynamic (hardware) techniques for instruction level parallelism	2	6
Multicores, multiprocessors and clusters	2	6
Thread Level Parallelism	2	6

Data level parallelism in Vector, SIMD and GPU architectures	2	6

2 Course components (total contact hours per semester):				
Lecture: 48hr	Tutorial:	Laboratory	Practical/Field work/Internship	Other:

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

    3 x 50 m/week

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;

- A description of the teaching strategies to be used in the course to develop that knowledge or skill;

- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

(i) Description of the knowledge to be acquired

(ii) Teaching strategies to be used to develop that knowledge

1. Assignments and solutions to the assignments, so that student can know their problems

2. Open-communication with students – show willingness to assist and take questions from students and clarify explanations in the class

3. Students presentations

4. Real-life examples: allows analysis of real-world scenarios

(iii) Methods of assessment of knowledge acquired

1. Exercises & Home works, Quizzes, Midterm, and Final Exam

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Ability to solve problems related to Computer Architecture.

2. Ability of deduction and inference.

3. Ability of analysis and design of advanced computer architecture

(ii) Teaching strategies to be used to develop these cognitive skills

1. Assignments.

(iii) Methods of assessment of students cognitive skills

1. Mid and Final Exams

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

Students should be able to

1. Understand and communicate to others the importance and relevance of statistics in the modern world

2. Be an independent learner, able to acquire further knowledge with some guidance or support.

3. Participate in group discussions

4. Manage time and meet deadlines.

(ii) Teaching strategies to be used to develop these skills and abilities

1. Assignments.

2. Students Presentations

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility

1. Mid and Final Exams

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

1. Case studies: the key method of discovering a student's dexterity in analyzing

2. Their recommendations, opinions and suggestions

3. Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills

4. Class discussions should indicate a student's prowess in responding

(ii) Teaching strategies to be used to develop these skills

1. Written Examinations

2. Assignments

3. Quizzes

(iii) Methods of assessment of students numerical and communication skills

1. Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills

2. Class discussions should indicate a student's prowess in responding

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required	
(ii) Teaching strategies to be used to develop these skills	
(iii) Methods of assessment of students psychomotor skills	

5. Schedule of Assessment Tasks for Students During the Semester			
Assess ment	Assessment task (e.g. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Attendance, Participation	Throughout semester	5%
2	Quiz	Throughout semester	10%
3	Mid Term	10	20%
4	Home Work	Throughout semester	15%
5	Final Exam	16	50%

D. Student Support

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

1. Faculty is available 10 hours per week for student help and consulting.

E Learning Resources

1. Required Text(s)
2. Essential References
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   1.   Computer Architecture: A Quantitative Approach, 5th Edition, John L. Hennessy and David A. Patterson, Morgan Kaufmann, 2012 2.   Computer Organization & Design: The Hardware/Software Interface, 5th edition, David A. Patterson and John L. Hennessy, Morgan Kaufmann, 2013
4-.Electronic Materials, Web Sites etc
5- Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.)   1. A Lecture room having Multimedia projector for lectures and students presentation.
2. Computing resources

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

G   Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

1.   Course Survey and students Feedback for each learning outcome of the course.

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

1.   Faculty meetings to discuss best practices and issues related to the course

2.   Comparison of the course content with similar courses offered in others colleges

3.   Updating course curriculum according to latest research done in the field.

3 Processes for Improvement of Teaching

1.   Departmental Meetings

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)

1.   Departmental Meetings

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

1.   Departmental Meetings and management meetings