电子科技大学
格拉斯哥学院
Glasgow College, UESTC

UESTC4019: Real-Time Computer Systems and Architecture

Lecture 1

Syllabus and Course Information

Teaching Team

- Course Coordinator

  Dr Wasim Ahmad (Wasim.Ahmad@Glasgow.ac.uk)

- GTAs and Lab Assistants

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Ercong Yu	ercong-kang@outlook.com
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Course Aims

- The aims of the course are:
  - to introduce the design of computer systems which must meet deadlines imposed by external hardware and/or design specifications;
  - to give appreciation of current design styles in computer architecture.

Intended Learning Outcomes (1)

- By the end of this course students will be able to:
  - describe the attributes of a real-time computers system and catagorise systems based upon analysis of design specification and/or information provided about the system;
  - estimate the execution time for code performing input and output functions, data storage in cache and virtual memory systems by calculating their average access times and storage requirements and then optimising execution time through appropriate selection of methods;
  - explain how information can be transmitted between computer systems via serial connections;

Intended Learning Outcomes (2)

- appraise the use of real-time operating systems and describe priority allocation policies such as rate monotonic scheduling;
- draw the state diagram for a simple models of a multiprocessor system and derive the equations from which the performance of the system can be calculated;
- describe the techniques underlying modern processor designs and real-time operating systems and discuss the inherent limitations on performance imposed by hardware and software.

Method of Delivery

- Course consists with 20 lectures (weeks 1, 2, 3, 5, 6, 8, 10, 12, 14, 15, & 16)
- Also consists with 4 labs (weeks 7, 9, 11, and 13)
- There will be at least 4 tutorial sessions. Week/Date and time of each tutorial session will be announced in the class in advance.

Course Schedule

	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
30-Aug-2021	1&2					
to	3&4					
3-Sep-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 3						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
13-Sep-2021	1&2					
to	3&4					
17-Sep-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 5						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
27-Sep-2021	1&2					
to	3&4					
1-Oct-2021	5&6					
	7&8					
	9&10	Lecture				

Week 7						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
11-Oct-2021	1&2					
to	3&4					
15-Oct-2021	5&6					
	7&8					Lab - Grp1
	9&10	Lab - Grp4			Lab - Grp3	Lab - Grp2

Week 9						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
25-Oct-2021	1&2					
to	3&4					
29-Oct-2021	5&6					
	7&8					Lab - Grp1
	9&10	Lab - Grp4			Lab - Grp3	Lab - Grp2

Week 11						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
8-Nov-2021	1&2					
to	3&4					
12-Nov-2021	5&6					
	7&8					Lab - Grp1
	9&10	Lab - Grp4			Lab - Grp3	Lab - Grp2

Week 13						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
22-Nov-2021	1&2					
to	3&4					
26-Nov-2021	5&6					
	7&8					Lab - Grp1
	9&10	Lab - Grp4			Lab - Grp3	Lab - Grp2

Week 15						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
6-Dec-2021	1&2					
to	3&4					
10-Dec-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
6-Sep-2021	1&2					
to	3&4					
10-Sep-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 4						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
20-Sep-2021	1&2					
to	3&4					
24-Sep-2021	5&6					
	7&8					
	9&10					

Week 6						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
4-Oct-2021	1&2					
to	3&4					
8-Oct-2021	5&6					
	7&8					Lecture
	9&10					

Week 8						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
18-Oct-2021	1&2					
to	3&4					
22-Oct-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 10						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
1-Nov-2021	1&2					
to	3&4					
5-Nov-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 12						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
15-Nov-2021	1&2					
to	3&4					
19-Nov-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 14						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
29-Nov-2021	1&2					
to	3&4					
3-Dec-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Week 16						
	Class Period	Monday	Tuesday	Wednesday	Thursday	Friday
13-Dec-2021	1&2					
to	3&4					
17-Dec-2021	5&6					
	7&8					Lecture
	9&10	Lecture				

Course Assessment

- Written Examination – 75 %
  - Final Exam: Closed book exam at the end of the semester
- Course work – 25%
  - Lab Exercises and Reports

Minimum Requirement for Award of Credits

- To receive a grade at the end of the course, you must:
  - attend all the labs (total 4 lab sessions),
  - complete all the lab exercises and submit lab reports by due date
  - attend the final exam
- If you fail to fulfil any of the above requirement, you will be given "CW".
- CW (Credit Withheld) means that you have not completed some part of the assessment (exam, laboratory report, etc) but can still do so before the next academic year. Contact the course lecturer if you are in doubt as to what you need to do.

Course Material and Resources

- All course material will be available on Moodle (UoG). https://moodle.gla.ac.uk/course/view.php?id=27174
  - Syllabus
  - Lecture slides
  - Audio/Video Lectures
  - Lab manual and datasheets
  - Tutorials
  - Past/sample exam paper

Reference Books

- You are **not required** to buy any textbook

- Recommended books for reference are:
  - The Designers Guide to the Cortex-M processor family by Trevor Martin
  - Computer Organisation and Architecture by William Stallings
  - Fundamentals of Embedded Software with the ARM Cortex-M3 by Daniel W Lewis

Lab Groups

- There are four lab groups so there will be four lab session during lab week
- Check your lab group and attend the group you belong to
- Students are not allowed to switch their lab group without lecturer permission
- Don’t miss the lab session

Lab Sessions

- Lab handout will be available on Moodle before each lab session (one week in advance)
- You are required to complete all the exercises (tasks) and the questionnaire, included in the lab handout, before the deadline
- Depending on the number of evaluation boards available in the lab, you may work in pairs during lab sessions, but each one of you will complete and submit your lab report individually by the due date

Final Exam

- All the material in the lectures, tutorials, and lab exercises are examinable
- Aim is to test your understanding not to test your memory of all the details; explain why – don’t recite what
- The final written exam consists of four questions of equal marks. Each question will have subsections

Tips - How to learn and achieve high grade in this course?

- Attend all the lectures and lab sessions
- Lots of self-study
- Solve given set of problems and from the reference books
- Spend time in the lab, write code, and test them
- Work on your lab exercises
- Solve past exam papers

Other Key Contacts

- Teaching office contact:

  Ruoli Zhong ruoli.zhong@glasgow.ac.uk

  Li Jing li.jing@glasgow.ac.uk
- Laboratory contact:

  Liling Liu lilingliu@uestc.edu.cn
- Lead GTA contact:

  Liyuan Qi 2288993q@student.gla.ac.uk

Complaints Procedure

Follow below process to contact us (more information can be found on Complaints Procedure Policy)

1. Academic Team (course coordinator)
   ⇩ Dr Wasim Ahmad Wasim.Ahmad@glasgow.ac.uk

2. Programme Director
   ⇩

Dr Sajjad Hussein (IE)

3. Co-Director (GC-UESTC CEDI): Dr Kelum Gamage
   ⇩

4. Vice Dean: Dr Joao Ponciano
   ⇩

5. Dean: Prof. Muhammad Imran