Template of Course Specification

Faculty: CIT
Department: CS
Program(s): Software Engineering

I. General information about the course:

1.	Course Title:	Embedded System Engineering				
2.	Course Code and Number :					
3.	Credit Hours: 3	Lecture	Seminar/Tutorial	Practical	Training	Total
		2		2		3
4.	Study Level and Semester:	Level 3 or 4 / Semester 6 or 7				
5.	Pre-requisites (if any):	- Computer programming, - Principles of operating systems, and - Software Engineering				
6.	Co-requisites (if any):					
7.	Program in which the course is offered	Software Engineering				
8.	Teaching Language:	English / Arabic				
9.	Study System :	Course Based				
10.	Prepared by:	Course Facilitator (Fahd N. Al-Wesabi)				
11.	Approval date :					
12.	Approved by:					

II. Course Description :

This course is important to software engineering students in order to take a look at the Fundamental principles and techniques for embedded software engineering are discussed. Major topics include: Microcontroller fundamentals for Embedded Systems; Embedded Systems Modeling, Analysis, and Design; Hardware and Software co-design; Peripheral interfacing; Multitasking and Real-time operating systems; Embedded programming with C++ and Embedded systems CMU development tools and kits.

III. Course Aims

- Understand basic concepts, functions, applications and structure of embedded systems, and microcontroller architecture
- Understand fundamental principles and methodologies of embedded software requirement analysis and design
- Appreciate the embedded system hardware and software co-design
- Understand the constraints in embedded software development
- Appreciate the software engineering discipline in the embedded SDLC
- Understand the interfacing of digital and analog I/O devices such as sensors
- Understand the modular multitasking programming
- Utilize development kits effectively in the embedded system development including RTOS.
- Learn the cutting edge embedded system development in Web and networking application
- Experience with real time embedded system project, work in a small team, cooperating on these aspects of software development
- Providing students with the necessary knowledge and skills in using embedded software CASE tools.

VI. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs	
After completing this program, students would be able to:	After completing this course, students would be able to:	
A2. Distinguish between selected canonical forms of operating systems and computer hardware, architecture and organization.	a1	Explore the principles of embedded systems design, its include of architectures, behaviors, functions, applications, components, structure and operating systems of embedded systems.
A3. Understand the use and impact of Information and Communication Technology (ICT) by recognizing the concepts of enterprise information management and networking		
A4. Understand the software process life cycles, for small, medium and large software projects, and different approaches of software development, software project management, risk and quality management, and human-computer interaction.	a2	Define the key issues that have to be considered when analyzing and designing embedded software, including issues of structure, development life cycle, approaches, methods, models, techniques, tools, quality standards and measurements, reliability, enterprise.

Intellectual Skills :		
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)		
Intellectual Skills PILOs		Intellectual Skills CILOs
After completing this program, students would be able to:		After completing this course, students would be able to:
B1. Determine and analyze criteria, specifications and requirements appropriate to specific computing problems and formulate strategies to solve them.	b1	Systematize the knowledge about structure and development of embedded systems to formulate and analyze specific problems in computing and solve them.
B2. Differentiate the various methods of computational thinking, determining their wide relevance and applicability within other domains in everyday life, and being able to employ them in different conditions.	b2	Propose and use the appropriate methods, models, techniques and tools for development, and maintain of each type of embedded systems.
B3. Choose the most appropriate methods and tools including deploying appropriate theory, practices, and tools for the specification, design, implementation, and maintenance as well as the evaluation of computer-based systems.		
B4. Criticize systems in terms of general quality attributes and possible tradeoffs presented within the given problem	b3	Systematize project plan and risk management procedures in embedded software projects.

Professional and Practical Skills		
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)		
Professional and Practical Skills PILOs		Professional and Practical Skills CILOs
After completing this program, students would be able to:		After completing this course, students would be able to:
C1. Apply fundamental concepts of computer science, software engineering, human-computer interaction, science and mathematics in the modeling and design of computer systems.	c1	Apply the emerging concepts of computing hardware and software and its theory to design various types of embedded systems.
C2 -Develop a wide range of software through all stages of their life cycle, namely problem analysis, requirements specification, design, construction; verification and evolution using appropriate methods and tools.	c2	Use CASE tools, graphical models, and appropriate diagrams types in UML to analyze and design components of embedded systems and conduct validation and verification processes as well as to analyze and interpret data.
C3. Operate computing equipment and software systems effectively and efficiently.		
C4. Evaluate software process and artifacts		

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in terms of software quality and models.		
C5- Plan, undertake, and monitor software projects.		

Transferable (General) Skills :		
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)		
Transferable (General) Skills PILOs		Transferable (General) Skills CILOs
After completing this program, students would be able to:		After completing this course, students would be able to:
D1. Communication skills: Make succinct presentations to a range of audiences about technical problems and their solutions. This may involve face-to-face, written communication or electronic communication.	d1	Clearly prepare and deliver coherent and structured verbal and written technical reports, communicate and describe embedded systems, in both oral presentation and in written documentation
D4. Self-management skills: Manage one's own learning and development, including time management and organizational skills.		
D5. Professional development skills: Keep abreast of current developments in the discipline to continue one's own professional development.		

IV. Alignment of CILOs to Teaching and Assessment Strategies

First: Alignment of Knowledge and Understanding CILOs

Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
a1. Explore the principles of embedded systems design, its include of architectures, behaviors, functions, applications, components, structure and operating systems of embedded systems.	- Lectures and Tutorials - Labs and Case studies - Homework - Classroom and tutorial assignments (problem solving) - Classroom discussion of real problems (brain storming) - Group-based project. - Research	- Homework reports - Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions - Project report and presentation - Research report and seminar presentation
a2. Define the key issues that have to be considered when designing and implementing embedded systems, including issues of structure, development life cycle, approaches, methods, models, techniques, tools, quality standards and measurements, reliability, enterprise.		

Second: Alignment of Intellectual Skills CILOs		
Intellectual Skills CILOs	Teaching Strategies	Assessment Strategies
b1. Systematize the knowledge	- Lectures and	- Homework reports

about structure and development of embedded systems to formulate and analyze specific problems in computing and solve them. b2. Propose and use the appropriate methods, models, techniques and tools for development, and maintain of each type of embedded systems b3. Systematize project plan and risk management procedures in embedded software projects.	Tutorials - Labs and Case studies - Homework - Classroom and tutorial assignments (problem solving) - Classroom discussion of real problems (brain storming) - Group-based project. - Research	- Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions - Project report and presentation - Research report and seminar presentation

Third: Alignment of Professional and Practical Skills CILOs		
Professional and Practical Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
c1. Apply the emerging concepts of computing hardware and software and its theory to design various types of embedded systems c2. Use CASE tools, graphical models, and appropriate diagrams types in UML to analyze and design components of embedded systems and conduct validation and verification processes as well as to analyze and interpret data.	- Lectures and Tutorials - Labs and Case studies - Homework - Classroom and tutorial assignments (problem solving) - Classroom discussion of real problems (brain storming) - Group-based project. - Research	- Homework reports - Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions - Project report and presentation - Research report and seminar presentation

Fourth: Alignment of Transferable (General) Skills CILOs		
Transferable (General) Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
d1. Clearly prepare and deliver coherent and structured verbal and written technical reports, communicate and describe embedded systems, in both oral presentation and in written documentation	- Lectures and Tutorials - Labs and Case studies - Homework - Classroom and tutorial assignments (problem solving) - Classroom discussion of real problems (brain storming) - Group-based project. - Research	- Homework reports - Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions - Project report and presentation - Research report and seminar presentation

V. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents					
First: Theoretical Aspects					
No.	**Course Topics/Units**	**Sub-topics**	**No. of Weeks**	**Contact Hours**	**CILOs**
1 2	**Fundamentals of Embedded System**	- Introduction to embedded systems - Review C programming - Getting Familiar with the embedded system development tools	2	3	a1, a2, c1, c2
3 4 5 6	**Software Engineering for Embedded software analysis and Design**	- Software Requirement Specification - Embedded Software Modeling Analysis and Design - Time requirement Analysis for Real-Time Systems Non-Preemptive Scheduling Priority-Based Preemptive Scheduling Fixed Priority Static analysis with RMS Dynamic Priority Analysis with DMS - Multi-Tasking Design Methodology - Software Design Issues - Task Interaction - Resource sharing	4	8	a1, a2, b1, b2, b3, c1, c2, d1
7	Mid-term Exam		1	2	
8 9	**Fundamentals of Microcontrollers**	- 8061 Microcontroller 8051 Chip Pins System Clock and Oscillator Circuits 8051 Internal Architecture - I/O Ports Port Reading and Writing The Port Alternate Functions - Memory and SFR	2	4	a1, a2, b1, c1, d1

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		- Interrupts External Interrupts Timer/Counter Interrupts Serial Interrupts			
10 11	**Embedded C programming**	- Memory in 8051 C Programming - Data Types of 8051 C - Interrupt and Reentrant Functions - Pointers - Mix C and Assembly Code - Modular Programming in C Scope of Functions and Variables Header Files Multi-module C Programming - Debug and Test Embedded C Program with Keil 8051	2	4	a1, a2, b1, b2, c1, c2
11	**Real Time Operating system**	- Tiny RTOS - Task Scheduling Round Robin Multitasking Cooperative Multitasking Priority-Driven Preemptive Multitasking - RTOS Events Signal Event Based Communication Message Event Based Communication Semaphores Attaching Interrupts to Tasks - Application of RTOS	1	2	a1, a2, b1, c1
12	**Serial Communication**	- Introduction to Serial Communications - UARTs and Transceivers - Configuring the Serial Port - Setting the Baud Rate - Reading and Writing to the Port Handshaking	1	2	a1, a2, b1, c1
13	**Embedded Network and Web Applications, the Future of the Microcontroller**		1	2	a1, a2, b1, c1

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14 15	**Embedded Systems Projects with I/O Interfaces**	Labs meetings	2	4	ALL
16	Final Exam	Final Exam	1	2	ALL
Total number of weeks and hours			**16**	**32**	

Second: Practical/Tutorial/Clinical Aspects				
Write up practical/tutorial/clinical topics				
No.	**Practical/Tutorial/Clinical topics**	**No. of Weeks**	**Contact Hours**	**CILOs**
1	Getting started with the 8051 – reading and writing ports	1	2	a1, a2, b1, c1
2	Identifying projects and groups	1	2	ALL
3	Intro to the 7-segment LED (direct driven and decoded)	1	2	ALL
4	Intro to A/D conversion using a light sensor (start using ISRs)	1	2	ALL
5	Intro to the Keypad	1	2	ALL
6	Intro to D/A conversion using a speaker	1	2	ALL
7	3-Wire RS232 Serial Communication	1	2	ALL
8	Intro to the LCD Display	1	2	ALL
	Advanced RS232 communications (handshaking)	1	2	ALL
	Stepper Motor Control	1	2	ALL
Total number of weeks and hours		**10**	**20**	

VI. Teaching strategies:

- Lectures, PPT and lecture notes
- Labs and case studies
- Homework
- Classroom discussion of a real problems (Brainstorming)
- Group-based project.
- Research and self-learning
- Problems Solving
- Classroom Tutorial (Applying case studies using CASE tools, and SmartDraw, UML)

VII. Tasks and Assignments :

No.	Task/Assignment	CILOs	Week due	Mark
1	Exercises & Homework & Quizzes	ALL	Weekly	15
2	Project (group)	ALL	Week 15	20
4	Interactive class discussion & Research	ALL	Weekly	5
5	Mid-term Exam (theoretical)	ALL	Week 8	10
6	Final Exam (theoretical)	ALL	Week 16	50

VIII. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

1. Qian, Haring, Cao, "Embedded Software Development with C", Springer, expected fall 2009

Essential References-not less than 4

2. Kai Qian, David den Haring, Li Cao, Embedded Software Development with C, Springer, 2010
3. Insup Lee, Joseph Y-T. Leung, Sang H. Son, Handbook of Real-Time and Embedded System Chapman and Hall/CRC, 2007.

Electronic Materials and Web Sites

http://users.ece.utexas.edu/~valvano/Datasheets/CPU12rg.pdf
http://users.ece.utexas.edu/~valvano/Datasheets/S12CPUV2.pdf

http://www.vmars.tuwien.ac.at/people/puschner.html
http://ieeexplore.ieee.org/Xplore/dynhome.jsp
http://www.springerlink.com

IX. Course Policies:

1 Class Attendance:

- Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved by the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused.
- In accordance with the university rules, if the percentage of student's absence exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable cause, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. - A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the half examination duration. - A student who comes late shall not be admitted to the examination hall, only within the first 30 minutes of the examination. After this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. - When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absence must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absence.
4	**Assignments & Projects:** Assignments and reports are to be submitted in hardcopy in due date in the class, unless otherwise that may be specified by the teacher. Email submissions of assignments are not accepted. Late assignments and reports will be penalized at least 5 % per day (including weekends and holidays). Depending on the circumstances the penalty may be higher, for example, if an assignment is received after the solution has been discussed.
5	**Cheating:** If a student is found cheating in examination (midterm or final or quizzes) (copying from unauthorized materials and another students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student is found engaging in any unauthorized communications (oral, sign, call, etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of assignments or practical reports without clear and adequate acknowledgement of the source. Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken assignments or practical reports of work submitted for assessment. All types of plagiarism are unacceptable and are considered dishonest practices. If a student is found plagiarism, the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned above policies.
7	**Other policies**: Students are expected to be punctual, and, as always, to conduct themselves professionally and courteously: Using electronic devices or speaking with each other is not allowed, the student involved shall be expelled out of the class and shall be considered to be absent

Course Syllabus

Faculty: CIT
Department: CS
Program(s): Software Engineering

I. General information about the course instructor :							
Name	Fahd Nasser A. Al-Wesabi	**Office Hours(3 Hours Weekly)**					
Location & phone number	**Sana'a, 60th street**	**Sat**	**Sun**	**Mon**	**Tue**	**Wed**	**Thu**
Email	fwesabi@gmail.com						

Faculty: CIT
Department: CS
Program(s): Software Engineering

X. General information about the course:						
13.	**Course Title:**	Real Time Systems				
14.	**Course Code and Number :**					
15.	**Credit Hours: 3**	**Lecture**	**Seminar/Tutorial**	**Practical**	**Training**	**Total**
		2		2		3
16.	**Study Level and Semester:**	Level 3 or 4 / Semester 6 or 7				
17.	**Pre-requisites (if any):**	- Computer programming, - Principles of operating systems, and - Software Engineering				
18.	**Co-requisites (if any):**					
19.	**Program in which the course is offered**	**Software Engineering**				
20.	**Teaching Language:**	English / Arabic				
21.	**Study System :**	Course Based				
22.	**Prepared by:**	Course Facilitator (Fahd N. Al-Wesabi)				
23.	**Approval date :**					
24.	**Approved by:**					

I. Course Description :

This course is important to software engineering students in order to take a look at the Fundamental principles and techniques for embedded software engineering are discussed. Major topics include: Microcontroller fundamentals for Embedded Systems; Embedded Systems Modeling, Analysis, and Design; Hardware and Software co-design; Peripheral interfacing; Multitasking and Real-time operating systems; Embedded programming with C++ and Embedded systems CMU development tools.

XI. Course Aims

- Understand basic concepts, functions, applications and structure of embedded systems, and microcontroller architecture
- Understand fundamental principles and methodologies of embedded software requirement analysis and design
- Appreciate the embedded system hardware and software co-design
- Understand the constraints in embedded software development
- Appreciate the software engineering discipline in the embedded SDLC
- Understand the interfacing of digital and analog I/O devices such as sensors
- Understand the modular multitasking programming
- Utilize development kits effectively in the embedded system development including RTOS.
- Learn the cutting edge embedded system development in Web and networking application
- Experience with real time embedded system project, work in a small team, cooperating on these aspects of software development
- Providing students with the necessary knowledge and skills in using embedded software CASE tools.

I. Course Intended Learning Outcomes (CILOs) :

1. Explore the principles of embedded systems design, its include of architectures, behaviors, functions, applications, components, structure and operating systems of embedded systems
2. Define the key issues that have to be considered when analyzing and designing embedded software, including issues of structure, development life cycle, approaches, methods, models, techniques, tools, quality standards and measurements, reliability, enterprise.
3. Systematize the knowledge about structure and development of embedded systems to formulate

and analyze specific problems in computing and solve them.

4. Propose and use the appropriate methods, models, techniques and tools for development, and maintain of each type of embedded systems.
5. Systematize project plan and risk management procedures in embedded software projects.
6. Apply the emerging concepts of computing hardware and software and its theory to design various types of embedded systems.
7. Use CASE tools, graphical models, and appropriate diagrams types in UML to analyze and design components of embedded systems and conduct validation and verification processes as well as to analyze and interpret data.
8. Clearly prepare and deliver coherent and structured verbal and written technical reports, communicate and describe embedded systems, in both oral presentation and in written documentation.

XII. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents					
First: Theoretical Aspects					
No.	**Course Topics/Units**	**Sub-topics**	**No. of Weeks**	**Contact Hours**	**CILOs**
1 2	**Fundamentals of Embedded System**	- Introduction to embedded systems - Review C programming - Getting Familiar with the embedded system development tools	2	3	a1, a2, c1, c2
3 4 5 6	**Software Engineering for Embedded software analysis and Design**	- Software Requirement Specification - Embedded Software Modeling Analysis and Design - Time requirement Analysis for Real-Time Systems Non-Preemptive Scheduling Priority-Based Preemptive Scheduling Fixed Priority Static analysis with RMS Dynamic Priority Analysis with DMS	4	8	a1, a2, b1, b2, b3, c1, c2, d1

		- Multi-Tasking Design Methodology - Software Design Issues - Task Interaction - Resource sharing			
7	Mid-term Exam		1	2	
8 9	**Fundamentals of Microcontrollers**	- 8061 Microcontroller 8051 Chip Pins System Clock and Oscillator Circuits 8051 Internal Architecture - I/O Ports Port Reading and Writing The Port Alternate Functions - Memory and SFR - Interrupts External Interrupts Timer/Counter Interrupts Serial Interrupts	2	4	a1, a2, b1, c1, d1
10 11	**Embedded C programming**	- Memory in 8051 C Programming - Data Types of 8051 C - Interrupt and Reentrant Functions - Pointers - Mix C and Assembly Code - Modular Programming in C Scope of Functions and Variables Header Files Multi-module C Programming - Debug and Test Embedded C Program with Keil 8051	2	4	a1, a2, b1, b2, c1, c2
11	**Real Time Operating system**	- Tiny RTOS - Task Scheduling Round Robin Multitasking Cooperative Multitasking Priority-Driven Preemptive Multitasking - RTOS Events Signal Event Based	1	2	a1, a2, b1, c1

		Communication Message Event Based Communication Semaphores Attaching Interrupts to Tasks - Application of RTOS			
12	**Serial Communication**	- Introduction to Serial Communications - UARTs and Transceivers - Configuring the Serial Port - Setting the Baud Rate - Reading and Writing to the Port Handshaking	1	2	a1, a2, b1, c1
13	**Embedded Network and Web Applications, the Future of the Microcontroller**		1	2	a1, a2, b1, c1
14 15	**Embedded Systems Projects with I/O Interfaces**	Labs meetings	2	4	ALL
16	Final Exam	Final Exam	1	2	ALL
Total number of weeks and hours			**16**	**32**	

Second: Practical/Tutorial/Clinical Aspects				
Write up practical/tutorial/clinical topics				
No.	**Practical/Tutorial/Clinical topics**	**No. of Weeks**	**Contact Hours**	**CILOs**
1	Getting started with the 8051 – reading and writing ports	1	2	a1, a2, b1, c1
2	Identifying projects and groups	1	2	ALL
3	Intro to the 7-segment LED (direct driven and decoded)	1	2	ALL
4	Intro to A/D conversion using a light sensor (start using ISRs)	1	2	ALL
5	Intro to the Keypad	1	2	ALL
6	Intro to D/A conversion using a speaker	1	2	ALL
7	3-Wire RS232 Serial Communication	1	2	ALL
8	Intro to the LCD Display	1	2	ALL

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	Advanced RS232 communications (handshaking)	1	2	ALL
	Stepper Motor Control	1	2	ALL
Total number of weeks and hours		**10**	**20**	

XIII. Teaching strategies:

- Lectures, PPT and lecture notes
- Labs and case studies
- Homework
- Classroom discussion of a real problems (Brainstorming)
- Group-based project.
- Research and self-learning
- Problems Solving
- Classroom Tutorial (Applying case studies using CASE tools, and SmartDraw, UML)

XIV. Tasks and Assignments :

No.	Task/Assignment	CILOs	Week due	Mark
1	Exercises & Homework & Quizzes	ALL	Weekly	15
2	Project (group)	ALL	Week 15	20
4	Interactive class discussion & Research	ALL	Weekly	5
5	Mid-term Exam (theoretical)	ALL	Week 8	10
6	Final Exam (theoretical)	ALL	Week 16	50

XV. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

4. Qian, Haring, Cao, "Embedded Software Development with C", Springer, expected fall 2009

Essential References-not less than 4

5. Kai Qian, David den Haring, Li Cao, Embedded Software Development with C, Springer, 2010
6. Insup Lee, Joseph Y-T. Leung, Sang H. Son, Handbook of Real-Time and Embedded System Chapman and Hall/CRC, 2007.

Electronic Materials and Web Sites

http://users.ece.utexas.edu/~valvano/Datasheets/CPU12rg.pdf

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http://users.ece.utexas.edu/~valvano/Datasheets/S12CPUV2.pdf http://www.vmars.tuwien.ac.at/people/puschner.html http://ieeexplore.ieee.org/Xplore/dynhome.jsp http://www.springerlink.com

XVI. Course Policies:	
1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved by the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. - In accordance with the university rules, if the percentage of student's absence exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable cause, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. - A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the half examination duration. - A student who comes late shall not be admitted to the examination hall, only within the first 30 minutes of the examination. After this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. - When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absence must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absence.
4	**Assignments & Projects:** Assignments and reports are to be submitted in hardcopy in due date in the class, unless otherwise that may be specified by the teacher. Email submissions of assignments are not accepted. Late assignments and reports will be penalized at least 5 % per day (including weekends and holidays). Depending on the circumstances the penalty may be higher, for example, if an assignment is received after the solution has been discussed.