University of Macau
Faculty of Science and Technology
Department of Computer and Information Science
SFTW452 – Groupware Systems
Syllabus
2nd Semester 2011/2012
Part A – Course Outline

Elective course in Computer Science

Catalog description:
(3-2) 4 credits. This course introduces students to the principles, design and implementation of groupware systems – systems intended to support groups of people working together. Design concepts covered include session management, coupling, undo/redo, access control, concurrency control, synchronization, and awareness. This course also includes an overview of representative samples of different kinds of groupware systems. The learned concepts are applied to groupware application development using an existing groupware toolkit.

Course type:
Theoretical with substantial laboratory/practice content

Prerequisites:
- SFTW231 (Operating Systems I)
- SFTW370 (Database Systems I)

Textbook(s) and other required material:
- This course does not use any textbook. Instead, teaching materials consist of current and historic conference and journal papers, as well as the instructor's lecture notes.

References:
- Various current and historic conference and journal papers related to the course content.

Major prerequisites by topic:
- Fundamental concepts of operating systems
- Fundamental concepts of database systems

Course objectives:
1. Introduce students to fundamental concepts, requirements and features of groupware systems. [c]
2. Enable students to distinguish different groupware systems by taxonomy and implementation approach. [a]
3. Introduce students to design principles of groupware systems. [c]
4. Learning to develop small-scale groupware applications with an existing groupware toolkit. [e, k, l]
5. Study and present a recent groupware system or groupware design/implementation approach. [a, g]

Topics covered:

1. **Introduction to Groupware and CSCW (4 hours):** Introduce basic definitions of groupware and CSCW, motivations for using groupware, the 3 'C's of cooperative work, groupware successes, groupware application areas, groupware system taxonomies, groupware design and implementation issues.

2. **Groupware Applications I: Session-Based Systems (2 hours):** Introduce definition of session concept, session-based communication, early session-based systems (Unix talk, MUD, DIVE), session management.

3. **Groupware Applications II: Message-Based Systems (1.5 hours):** Introduce definition of message concept, message-based communication, early message-based systems (email, Information Lens, Computational Email/ATOMICMAIL).

4. **Groupware Applications III: Artefact-Based Systems (1.5 hours):** Introduce definition of artefact concept, artefact sharing, early artefact-based systems (file sharing, Quilt, PREP).

5. **Groupware Applications IV: Hybrid Systems (2 hours):** Introduce hybrid system types, example systems: session- & message-based (MUD, workflow), session- & artefact-based (GROVE), message- & artefact-based (POLITeam), session- & message- & artefact-based (CAIS).
6. **Groupware Design Issues I: Awareness (4 hours):** Study definition and types of awareness, elements of workspace awareness, awareness & synchrony, awareness techniques.
7. **Groupware Design Issues II: Concurrency Control (3 hours):** Study concurrency problem, concurrency control techniques: locking, transactions, floor control, dependency detection, reversible execution, operation transformation.
8. **Groupware Design Issues III: Multi-User Undo/Redo (2 hours):** Study multi-user undo/redo requirements, simple multi-user undo/redo model, undo/redo of corresponding commands, non-last undo/redo.
9. **Instant Messaging Infrastructure and XMPP (2 hours):** Introduce overview of instant messaging and its functions, centralized vs distributed architecture, closed vs open IM systems, Jabber/XMPP, XML streams & stanzas, Jabber IDs, groupware applications based on Jabber.
10. **Introduction to Tcl I (1 hour):** Study command format, variables and data types, math operators and expressions, string manipulation, regular expressions.
11. **Introduction to Tcl II (1 hour):** Study list data type and list manipulation, arrays and array manipulation, conditional statements, iteration statements, procedures, return values, global variables, file processing, operating system interaction.
12. **Introduction to Tk I (1 hour):** Study fundamentals of Tk, Tk widget classes and instances, widget commands and options, geometry management, label widget, button widget, frame widget.
13. **Introduction to Tk II (1 hour):** Study menus, entry widget, listbox widget, text widget, scrollbar widget, event binding, window manager interaction.
14. **Introduction to GroupKit I (1 hour):** Study background of GroupKit, features, runtime infrastructure, registrar, session manager, conference application, multicast RPC.
15. **Introduction to GroupKit II (1 hour):** Study application design, group-enabling single-user applications, GroupKit menus, multi-user scrollbars, telepointers.
16. **Introduction to GroupKit III (1 hour):** Study group events and event handling, managing participant information, registry keys, custom event handling.
17. **Introduction to GroupKit IV (1 hour):** Study GroupKit environments and their features, sharing modes, environment notification, environment event binding, environment commands, environments and MVC.
18. **New Developments in Groupware Systems (Student Presentations) (10 hours):** Students present new developments in groupware systems based on recent conference papers.

Class/laboratory schedule:

Timetabled work in hours per week			No of teaching weeks	Total hours	Total credits	No/Duration of exam papers
Lecture	Tutorial	Practice				
3	0	2	14	70	4	1 / 3 hours

Student study effort required:

Class contact:	
Lecture	30 hours
Student presentations	10 hours
Mid-term exam	2 hours
Practice	28 hours
Other study effort:	
Self-study	42 hours
Homework assignment	32 hours

Total student study effort	144 hours

Student assessment:

Final assessment will be determined on the basis of:

Homework Assignments	30%
Paper presentation	10%
Mid-term Exam	20%
Final Exam	40%

Course assessment:

The assessment of course objectives will be determined on the basis of:

1. Homework assignments and exams
2. Course evaluation

Course outline:

Weeks	Topic	Course work
1-2	**Introduction to Groupware and CSCW** Basic definitions of groupware and CSCW, motivations for using groupware, the 3 'C's of cooperative work, groupware successes, groupware application areas, groupware system taxonomies, groupware design and implementation issues.	
2	**Groupware Applications I: Session-Based Systems** Definition of session concept, session-based communication, early session-based systems (Unix talk, MUD, DIVE), session management.	
3	**Groupware Applications II: Message-Based Systems** Definition of message concept, message-based communication, early message-based systems (email, Information Lens, Computational Email/ATOMICMAIL).	Assignment 1 (paper presentation)
3	**Groupware Applications III: Artefact-Based Systems** Definition of artefact concept, artefact sharing, early artefact-based systems (file sharing, Quilt, PREP).	
4	**Groupware Applications IV: Hybrid Systems** Hybrid system types, example systems: session- & message-based (MUD, workflow), session- & artefact-based (GROVE), message- & artefact-based (POLITeam), session- & message- & artefact-based (CAIS).	
5-6	**Groupware Design Issues I: Awareness** Definition and types of awareness, elements of workspace awareness, awareness & synchrony, awareness techniques. **Introduction to Tcl (I)** Command format, variables and data types, math operators and expressions, string manipulation, regular expressions. **Introduction to Tcl (II)** List data type and list manipulation, arrays and array manipulation, conditional statements, iteration statements, procedures, return values, global variables, file processing, operating system interaction.	
7-8	**Groupware Design Issues II: Concurrency Control** Concurrency problem, concurrency control techniques: locking, transactions, floor control, dependency detection, reversible execution, operation transformation. **Introduction to Tk (I)** Fundamentals of Tk, Tk widget classes and instances, widget commands and	Assignment 2 (Tcl/Tk program)

	options, geometry management, label widget, button widget, frame widget. **Introduction to Tk (II)** Menus, entry widget, listbox widget, text widget, scrollbar widget, event binding, window manager interaction.	
9	**Groupware Design Issues III: Multi-User Undo/Redo** Multi-user undo/redo requirements, simple multi-user undo/redo model, undo/redo of corresponding commands, non-last undo/redo. **Introduction to GroupKit (I)** Background of GroupKit, features, runtime infrastructure, registrar, session manager, conference application, multicast RPC.	Mid-term exam
10	**Instant Messaging Infrastructure and XMPP** Overview of instant messaging and its functions, centralized vs distributed architecture, closed vs open IM systems, Jabber/XMPP, XML streams & stanzas, Jabber IDs, groupware applications based on Jabber. **Student Presentations (I)** Students present new developments in groupware systems based on recent conference papers.	
11	**Introduction to GroupKit (II)** Application design, group-enabling single-user applications, GroupKit menus, multi-user scrollbars, telepointers. **Student Presentations (II)** Students present new developments in groupware systems based on recent conference papers.	Assignment 3 (GroupKit program with multicast RPC)
12	**Introduction to GroupKit (III)** Group events and event handling, managing participant information, registry keys, custom event handling. **Student Presentations (III)** Students present new developments in groupware systems based on recent conference papers.	
13	**Introduction to GroupKit (IV)** GroupKit environments and their features, sharing modes, environment notification, environment event binding, environment commands, environments and MVC. **Student Presentations (IV)** Students present new developments in groupware systems based on recent conference papers.	Assignment 4 (GroupKit program with environments)
14	**Student Presentations (V)** Students present new developments in groupware systems based on recent conference papers.	

Contribution of course to meet the professional component:

This course prepares students to work professionally in the area of software development.

Relationship to CS program objectives and outcomes:

This course primarily contributes to the Computer Science program outcomes that develop these student abilities:
(a) an ability to apply knowledge of computing, mathematics, science, and engineering.
(c) an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

(e) an ability to analyze a problem, and identify, formulate and use the appropriate application requirements for obtaining its computing solution.

The course secondarily contributes to the Computer Science program outcomes that develop these student abilities:
(g) an ability to communicate effectively.
(k) an ability to use the techniques, skills, and modern computer tools necessary for engineering practice.
(l) an ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations.

Relationship to CS program criteria:

Criterion	DS	PF	AL	AR	OS	NC	PL	HC	GV	IS	IM	SP	SE	CN
Scale: 1 (highest) to 4 (lowest)		4				4		1			2		3	

Discrete Structures (DS), Programming Fundamentals (PF), Algorithms and Complexity (AL), Architecture and Organization (AR), Operating Systems (OS), Net-Centric Computing (NC), Programming Languages (PL), Human-Computer Interaction (HC), Graphics and Visual Computing (GV), Intelligent Systems (IS), Information Management (IM), Social and Professional Issues (SP), Software Engineering (SE), Computational Science (CN).

Course content distribution:

Percentage content for			
Mathematics	Science and engineering subjects	Complementary electives	**Total**
0%	20%	80%	100%

Coordinator:
Prof. Xiaoshan Li

Persons who prepared this description:
Robert P. Biuk-Aghai

Part B General Course Information and Policies

2nd semester 2011/2012

Instructor:	Dr. Robert P. Biuk-Aghai	Office: N325
Office Hour:	Mon, Tue & Fri 10:30 am – 12:30 pm, or by appointment	Phone: 8397 4375
Email:	robertb@umac.mo	

Time/Venue: Tue 11:30am - 12:30pm, Wed 11:30am - 1:30pm, L107 (lectures)
Sat 11:30am - 1:30pm, T103 (laboratory)

Grading Distribution:

Percentage Grade	Final Grade	Percentage Grade	Final Grade	Percentage Grade	Final Grade
100 – 93	A	77 – 73	B-	57 – 53	D+
92 – 88	A-	72 – 68	C+	52 – 50	D
87 – 83	B+	67 – 63	C	below 50	F
82 – 78	B	62 – 58	C-		

Comment:
The objectives of the lectures are to explain and to supplement the material contained in the related reading materials. Students are responsible for the assigned material whether or not it is covered in the lectures. Students who wish to succeed in this course should read the lecture notes prior to the lecture and should do all homework assignments and lab exercises. You are encouraged to look at other sources (other texts, etc.) to complement the lectures and primary text.

Homework Policy:
The completion and correction of homework is a powerful learning experience; therefore:
- There will be 4 homework assignments.
- Homework is due one week after assignment unless otherwise noted, and no late homework is accepted.
- Possible revision of homework grades may be discussed with the grader within one week from the return of the marked homework.
- The course grade will be based on the average of the homework grades.

Mid-term Exam:
There will be one mid-term exam held at about the middle of the semester.

Note
- The lecture session is an important part of this course and attendance is compulsory. At most 20% absence without leave is allowed.
- Check UMMoodle (ummoodle.umac.mo) for announcements, homework assignments and lecture notes. Report any mistakes on your grades within one week after posting.
- No make-up exam is given except for CLEAR medical proof.
- No exam is given if you are 30 minutes late in the midterm exam, or 45 minutes late in the final exam. Even if you are late in the exam, you must turn in at the due time.
- Cheating is strictly prohibited by the university and will be severely punished.

Rubric for Program Outcomes (a) to (l)

Rubric for (a)	5 (Excellent)	3 (Average)	1 (Poor)
Understand the theoretic background	Students understand theoretic background and the limitations of the respective applications.	Students have some confusion on some background or do not understand theoretic background completely.	Students do not understand the background or do not study at all.
Use a correct model and formulation correctly	Students choose a model correctly and properly apply correct techniques.	Students choose a wrong model sometime, use a wrong formula, or a different technique.	Students use a wrong model and wrong formula, or do not know how to model.
Compute the problem correctly	Students use correct techniques, analyze the problems, and compute them correctly.	Students sometime solve problem mistakenly using wrong techniques.	Students do not know how to solve problems or use wrong techniques completely.

Rubric for (c)	5 (Excellent)	3 (Average)	1 (Poor)
Design capability and design constraints	Student understands very clearly what needs to be designed and the realistic design constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Student understands what needs to be designed and the design constraints, but may not fully understand the limitations of the design constraints.	Student does not understand what needs to be designed and the design constraints.
Process to meet desired needs	Student understands very clearly the process of the design.	Student understands what the needs of the process design, but may not fully understand the limitations of the design constraints.	Student does not understand the process.

Rubric for (e)	5 (Excellent)	3 (Average)	1 (Poor)
Identify applications in engineering systems	Students understand problem and can identify fundamental formulation.	Students understand problem but cannot apply formulation, or cannot understand problem.	Students cannot identify correct terms for engineering applications.
Modeling, problem formulation and problem solving	Students choose and properly apply the correct techniques.	Students model correctly but cannot select proper technique or model incorrectly but solve correctly accordingly.	Students at loss as to how to solve a problem.

Rubric for (g)	5 (Excellent)	3 (Average)	1 (Poor)
Professional impact	Student's/Team's/Group's document(s)/presentation(s) is/are considered to be of professional quality.	Student's/Team's/Group's document(s)/presentation(s) is/are considered acceptable for college level work.	Student's/Team's/Group's document(s)/presentation(s) is/are considered unacceptable for college level work.
Written component	Document is nearly error free with sophisticated use of vocabulary, formatted properly, with well-developed concise sentences and paragraphs.	Document contains some errors with a somewhat colloquial vocabulary, minor formatting issues, with some organizational issues that do not interfere with communication.	Document contains many errors, very colloquial vocabulary, with severe organizational issues that interfere with communication. Document would be considered unacceptable.

Oral component	Presentation is consistent, uniform, clear, direct, complete and captivating with very clear fonts and graphics with an excellent layout that clearly presents the technical content.	Presentation is somewhat inconsistent between speakers, occasionally difficult to hear, with an acceptable layout containing acceptable fonts and graphics that adequately presents the technical content.	Presentation is very inconsistent between speakers, difficult to hear with a poor layout containing illegible fonts and graphics that poorly presents the technical content. Would be considered unacceptable.

Rubric for (k)	**5 (Excellent)**	**3 (Average)**	**1 (Poor)**
Use modern principles, skills, and tools in engineering practice	Student applies the principles, skills and tools to correctly model and analyze engineering problems, and understands the limitations.	Student applies the principles, skills and tools to analyze and implement engineering problems.	Student does not apply principles and tools correctly and/or does not correctly interpret the results.

Rubric for (l)	**5 (Excellent)**	**3 (Average)**	**1 (Poor)**
Use modern computer/IT tools relevant to the discipline	Student uses computer/IT tools relevant to the engineering discipline, and understands their limitations.	Student uses computer /IT tools relevant to the engineering discipline.	Student does not use computer/IT tools relevantly, and does not understand their limitations.