

University of Macau
Faculty of Science and Technology
Department of Computer and Information Science
CISB452 – Groupware Systems
Syllabus
2nd Semester
Part A – Course Outline

Required Elective course in Computer Science

Catalog description:

(2-2) 3 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:

- CISB221 (Introduction to Database Systems)
- CISB222 (Principles of Operating Systems)

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 database systems
- Fundamental concepts of operating 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. [d, j]
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 (1 hour):** 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 hour):** 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 hour):** Introduce definition of artefact concept, artefact sharing, early artefact-based systems (file sharing, Quilt, PREP).

5. **Groupware Applications IV: Hybrid Systems (1 hour):** 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 (2 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.

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				
2	1	1	14	56	3	1 / 2 hours

Student study effort required:

Class contact:	
Lecture	26 hours
Tutorial (incl. student presentations)	14 hours
Mid-term exam	2 hours
Practice	14 hours
Other study effort:	
Self-study	28 hours
Presentation and programming projects	24 hours
Total student study effort	108 hours

Student assessment:

Final assessment will be determined on the basis of:

Paper Presentation	10%
Programming Projects	30%
Mid-term Exam	20%
Final Exam	40%

Course assessment:

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

1. Paper presentation, programming projects 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.	
3	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 (paper presentation)
4	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	Introduction to Tcl (I) Command format, variables and data types, math operators and expressions, string manipulation, regular expressions.	
5	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.	
6-7	Groupware Design Issues I: Awareness Definition and types of awareness, elements of workspace awareness, awareness & synchrony, awareness techniques.	
8	Introduction to Tk (I) Fundamentals of Tk, Tk widget classes and instances, widget commands and options, geometry management, label widget, button widget, frame widget.	
8	Introduction to Tk (II) Menus, entry widget, listbox widget, text widget, scrollbar widget, event binding, window manager interaction.	Programming Project 1 (Tcl/Tk program)

9	Mid-term exam	
10	Groupware Design Issues II: Concurrency Control Concurrency problem, concurrency control techniques: locking, transactions, floor control, dependency detection, reversible execution, operation transformation.	
11	Introduction to GroupKit (I) Background of GroupKit, features, runtime infrastructure, registrar, session manager, conference application, multicast RPC.	
11	Introduction to GroupKit (II) Application design, group-enabling single-user applications, GroupKit menus, multi-user scrollbars, telepointers.	
12	Introduction to GroupKit (III) Group events and event handling, managing participant information, registry keys, custom event handling.	Programming Project 2 (GroupKit program with multicast RPC)
12-13	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.	
13	Introduction to GroupKit (IV) GroupKit environments and their features, sharing modes, environment notification, environment event binding, environment commands, environments and MVC.	Programming Project 3 (GroupKit program with environments)
14	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.	

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 and mathematics appropriate to the programme outcomes and to the discipline.

(c) An ability to analyse a problem, and identify and define the computing requirements appropriate to its solution.

(d) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, social and environmental considerations.

(g) An ability to communicate effectively with a range of audiences.

(j) An ability to use current techniques, skills, and tools necessary for computing practice with an understanding of the limitations.

Relationship to CS programme outcomes:

	Programme Outcomes									
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
CISB452 Groupware Systems	TP		TP	TP			TP			TP

T – Teach, P – Practice, M – Measured

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

Instructor: Dr. Robert P. Biuk-Aghai
Office Hour: TBA, or by appointment
Email: robertb@umac.mo

Office: E11-4006
Phone: 8822 4375

Time/Venue: TBA (lectures)
TBA (tutorial)
TBA (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 the homework assignment, all programming projects and the 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 and programming projects is a powerful learning experience; therefore:

- There will be 1 homework assignment and 3 programming projects.
- The homework assignment and programming projects are due one week after assignment unless otherwise noted, and no late submission is accepted.
- Possible revision of homework/project grades may be discussed with the grader within one week from the return of the marked homework/project.
- The course grade will be based on all the homework/project 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 and project 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.

Student Disabilities Support Service:

The University of Macau is committed to providing an equal opportunity in education to persons with disabilities. If you are a student with a physical, visual, hearing, speech, learning or psychological impairment(s) which substantially limit your learning and/or activities of daily living, you are encouraged to communicate with your instructors about your impairment(s) and the accommodations you need in

your studies. You are also encouraged to contact the Student Disability Support Service of the Student Counselling and Development Section (SCD) in Student Affairs Office, which provides appropriate resources and accommodations to allow each student with a disability to have an equal opportunity in education, university life activities and services at the University of Macau. To learn more about the service, please contact SCD at scd.disability@umac.mo, or 8822 4901 or visit the following website: