University of Macau
Faculty of Science and Technology
Department of Computer and Information Science
CISB458 – Software Project Management
Syllabus
1ˢᵗ Semester 2017/2018
Part A – Course Outline

Required Elective course in Computer Science

Course description:
(2-2) 3 credits. This course introduces project management as it relates to the software life cycle. Different software life cycle models, and the project management activities in each phase of the life cycle, are studied. Project planning activities are introduced, including effort estimation and the use of software metrics; risk analysis; resource allocation; and project scheduling. The course concludes with a study of project monitoring and control, project contracts, and team organization.

Course type:
Theoretical with substantial laboratory/practice content

Prerequisites:
none

Textbook(s) and other required material:
- Bob Hughes & Mike Cotterell, *Software Project Management*, 5th ed., McGraw-Hill, 2010. (Required)

References:
- John J. Rakos, *Software Project Management for Small to Medium Sized Projects*, Prentice Hall, 1990.
- William H. Roetzheim, *Structured Computer Project Management*, Prentice Hall, 1988.
- Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 7th ed., McGraw-Hill, 2009.
- Tom DeMarco, *Controlling Software Projects: Management, Measurement and Estimates*, Prentice Hall, 1986.

Major prerequisites by topic:
none

Course objectives:
1. Introduce students to fundamental concepts of software projects and their management. [a]
2. Enable students to understand and differentiate software development life cycle models, and select a suitable model for a given project. [c]
3. Introduce students to techniques of project planning, monitoring and control. [a]
4. Understand concepts of project team composition. [a]
5. Learn to prepare, maintain and communicate a project plan. [d, g]
6. Learn to apply project management tools to software project management. [a, j]

Topics covered:
1. **Introduction to software project management (4 hours):** Study the importance of software project management, basic definitions and project characteristics, project management activities in different project life cycle stages, project objectives and measures, management control.
2. **Step Wise project planning method (3 hours):** Give an overview of the Step Wise project planning method, project scope and objectives, project infrastructure and characteristics, products and activities, effort estimation, risk analysis, resource allocation, publicising the plan.
3. **Programme management and project evaluation (3 hours):** Study programme vs project management, benefits management, cost-benefit analysis (net profit, return on investment, payback period, net present value, internal rate of return), risk profile analysis.

4. **Selection of an appropriate project approach (2 hours):** Introduce overall project risks, process models: waterfall, V-process mode, spiral model, prototyping, incremental process, agile methods, extreme programming.
5. **Software effort estimation (2 hours):** Introduce bottom-up estimation, top-down estimation, function point analysis, function points Mk II, COCOMO, estimation by analogy.
6. **Activity planning (2 hours):** Study product breakdown, product flow, work breakdown, PERT charts, CPM charts, lead and lag times, task dependencies, calculating schedule dates, task float, critical path.
7. **Risk management (2 hours):** Introduce definitions of risk, risk cause and effect, risk identification, causal mapping, risk prioritization, risk planning, risk reduction, calculating z value and likelihood of meeting targets, critical chain approach.
8. **Resource allocation (2 hours):** Introduce definition of resources, resource histogram, resource levelling, Burman's priority list, allocating individuals, cost schedules.
9. **Monitoring and control (2 hours):** Study project control cycle, assessing progress, representing progress (red/amber/green reporting, Gantt charts, slip charts, ball charts, timeline), cost monitoring, earned value analysis, change control.
10. **Project contracts (2 hours):** Study software acquisition process, request for proposals, types of contract (fixed price, time and materials, fixed price per unit), tendering process, contract terms.
11. **Managing people and organizing teams (2 hours):** Introduce organizational behaviour, motivation, team formation and team balance, team roles, task type, leadership type, virtual projects, communication methods by project phase, cultural influence.

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	14 hours
Practice	14 hours
Mid-term exam	2 hours
Other study effort:	
Self-study	14 hours
Project management practices	4 hours
Total student study effort	60 hours

Student assessment:
Final assessment will be determined on the basis of:
Homework assignment   10%
Project management practices   20%
Mid-term exam   30%
Final exam   40%

Course assessment:
The assessment of course objectives will be determined on the basis of:
1. Project management practices and exams
2. Course evaluation

Course outline:

Weeks	Topic	Course work
1-2	**Introduction to software project management** Importance of software project management, basic definitions and project characteristics, project management activities in different project life cycle stages, project objectives and measures, management control.	
3-4	**Step Wise project planning method** Overview of the Step Wise project planning method, project scope and objectives, project infrastructure and characteristics, products and activities, effort estimation, risk analysis, resource allocation, publicising the plan.	
4-5	**Programme management and project evaluation** Programme vs project management, benefits management, cost-benefit analysis (net profit, return on investment, payback period, net present value, internal rate of return), risk profile analysis.	
6	**Selection of an appropriate project approach** Overall project risks, process models: waterfall, V-process mode, spiral model, prototyping, incremental process, agile methods, extreme programming.	
7	**Software effort estimation** Bottom-up estimation, top-down estimation, function point analysis, function points Mk II, COCOMO, estimation by analogy.	
8	**Activity planning** Product breakdown, product flow, work breakdown, PERT charts, CPM charts, lead and lag times, task dependencies, calculating schedule dates, task float, critical path.	
9	**Risk management** Definitions of risk, risk cause and effect, risk identification, causal mapping, risk prioritization, risk planning, risk reduction, calculating z value and likelihood of meeting targets, critical chain approach.	
10	(*exam week*)	Mid-term exam, Assignment
11	**Resource allocation** Definition of resources, resource histogram, resource levelling, Burman's priority list, allocating individuals, cost schedules.	Project management practice 1
12	**Monitoring and control** Project control cycle, assessing progress, representing progress (red/amber/green reporting, Gantt charts, slip charts, ball charts, timeline), cost monitoring, earned value analysis, change control.	
13	**Project contracts** Software acquisition process, request for proposals, types of contract (fixed price, time and materials, fixed price per unit), tendering process, contract terms.	Project management practice 2
14	**Managing people and organizing teams** Organizational behaviour, motivation, team formation and team balance, team roles, task type, leadership type, virtual projects, communication methods by project phase, cultural influence.	

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)**
CISB458 Software Project Management	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	1	

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%	50%	50%	100%

Coordinator:
Prof. Xiaoshan Li

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

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Part B General Course Information and Policies

1ˢᵗ semester 2017/2018

Instructor:	Dr. Robert P. Biuk-Aghai	Office: E11-4006
Office Hour:	Mon 10:30–11:30am & Wed 11am–12pm, or by appointment	Phone: 8822 4375
Email:	robertb@umac.mo	

Time/Venue: Lecture: Mondays, 11:30 am – 1:15 pm
Tutorial: Thursdays, 11:30 am – 12:20 pm
Lab: Fridays, 11:00 am – 11:50 am

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 text material. 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 practice 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 the practice exercises is a powerful learning experience; therefore:
- There will be 1 assignment and 2 graded practice exercises.
- The assignment and practice exercises are due one week after given unless otherwise noted, and late submissions will lose points (1% point off per hour late).
- Possible revision of grades may be discussed with the grader within one week from the return of the marked submission.
- The course grade will be based on the average of the assignment and practice exercises.

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, practice exercises 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, please communicate with your instructors about your impairment(s) and contact Disability Support Services in Student Affairs Office (SAO) immediately, which Student Affairs Office colleague helps coordinate and

provide 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 Student Counselling Section in SAO at sao.disability@umac.mo, or 8822 4901 or visit the following website: http://www.umac.mo/sao.