ISYS114

Introduction to Database Design and Management

S2 Evening 2017

Dept of Computing

Contents

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General Information

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Credit points
3

Prerequisites

Corequisites

Co-badged status

Unit description
This unit introduces students to the principles and concepts of data storage, management and modelling, including the role of data and information in organisations. The unit will cover conceptual modelling techniques, converting conceptual data models into relational data models and verifying its structural characteristics with nomalisation techniques, and implementing and utlising a relational database using a database-management system. Fundamental data modelling tools, techniques and query languages such as Structured Query Language (SQL) will be used. Ethical and green approaches to the collection, backup, use and storage of data and the construction of systems are emphasised. An introduction to the concepts and issues relating to data warehousing, governance, administration, security and privacy and alternative database structures such as distributed and object oriented databases will be provided. The unit concentrates upon building a firm foundation in information representation, organisation and storage with particular emphasis upon the application of database systems.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Analyse data requirements and design and develop conceptual database models.

Implement system models into databases, design and create simple databases for business information systems and write programs to produce interactive queries.

Explain the role and nature of ethics and sustainability in the IT environment.

Use data analysis and data modelling techniques and tools for introductory level database design and specification

General Assessment Information

ASSESSMENT PROCEDURE

A more detailed description of each task is given below.

Workshop Attendance

Workshops are combined practicals and tutorials. Each week your attendance will be recorded in your scheduled workshop and you will receive 1 mark for attendance & active participation. There are 12 weeks of workshops, however, the total attendance mark is limited to 10 throughout the semester.

Attendance at workshops in this unit is NOT a hurdle requirement. However, if you do not attend all the workshops, you are unlikely to have sufficient knowledge to pass the exam or sufficient total marks to be able to pass the unit.

Assignments

There are 3 assignments.

1. The first assignment requires you to apply and develop your understanding of data modeling concepts and submit a professionally presented document demonstrating the use of data modeling skills. The document must be prepared using a standard word processor such as Word and diagrams should be created using a CASE tool such as Power Designer.
2. The second assignment assesses your ability to design a database and provide interactive queries.
3. The third assignment requires you to work in pairs to research a given database-related topic and present your findings to the class.

The first two assignments will be submitted and marked online. The third assignment will be marked in the tutorial class by your tutor.

You are encouraged to:

- set your personal deadline earlier than the actual one;

- keep backups of all your important files;

- make sure that no-one else picks up your printouts.

If you cannot submit on time because of illness or other circumstances, please contact the lecturer **before** the due date.

No extensions will be granted. Late assignments will be accepted up to 72 hours after the submission deadline. There will be a deduction of 20%* of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 40% penalty). This penalty does not apply for cases in which an application for disruption to studies is made and approved.

Assignment submission in this unit is NOT a hurdle requirement. However, if you do not make a reasonable attempt at all three assignments, you are unlikely to have sufficient knowledge to pass the exam or sufficient total marks to be able to pass the unit.

Final Examination

For this unit, a final examination will test your learning and knowledge of learning outcomes #1, #2, #3 and #4. The final examination accounts for 50% of the final mark.

The final examination in this unit is a hurdle requirement. You must get a mark of at least 40% in the examination to pass the unit. If you get a mark of at least 30% in your first attempt at the final examination you will be given a second and final attempt to resit and pass the examination.

Second-chance hurdle examinations will be offered in the week of December 11th - 15th. You must make yourself available during that week to take advantage of this opportunity.

Regarding the examination process, note that

- you must attend all required classes and submit all required assessment, otherwise the Executive Dean of the Faculty or delegated authority has the power to refuse permission to attend the final examination.

- the University Examination period in for Second Half Year is mid November to mid December.

- you are expected to present yourself for examination at the time and place designated in the University Examination Timetable.

- the timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of examinations.

- no early examinations for individuals or groups of students will be set. All students are expected to ensure that they are available until the end of the teaching semester, that is the final day of the official examination period.

- the only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to lodge an application for disruption to studies.

Standards

Four standards, namely Developing, Functional, Proficient, and Advanced, summarize as many different levels of achievement. Each standard is precisely defined to help students know what kind of performance is expected to deserve a certain grade. Typically, Developing corresponds PC, Functional is for P, Proficient for Cr, and Advanced covers D and HD. The standards corresponding to the learning outcomes and criteria of this unit are given below:

	Standards			
Criteria for L.O. #1	**Developing**	**Functional**	**Proficient**	**Advanced**
Data Analysis and Modeling	Has limited understanding and ability to apply analysis, modeling and programming concepts and techniques. Assignment and exam performance shows functional level of understanding on some but not all assessment tasks.	Demonstrates knowledge of terms and core concepts. Assignment and exam performance shows basic understanding and ability to apply most of the data modeling and implementation concepts and techniques.	Understands most of the data modelling concepts and can apply them appropriately. Implements most of the tasks specified. Assignment and exam performance shows good understanding of data analysis and modeling concepts and application of these skills in conceptual database design.	Shows depth of understanding of data analysis and modeling concepts and implements all tasks as specified with professional presentation. Assignment and exam performance shows critical thought and comprehension of the software development big picture and related issues and activities.
Criteria for L.O. #2				
Data Base	Inaccurate reproduction of definitions and ideas, show limited understanding of database principles. Able to apply some of the basic database functionality in the assignments and final exam.	Reproduce definitions and ideas, show some breath of understanding of Database principles. Able to apply most of the basic database functionality in the assignments and final exam.	Show breath of understanding of database principles. Able to apply most of database functionality in the assignments and final exam.	Apply terminology and ideas in some new contexts, show some depth of understanding of database principles. Able to apply most of database functionality in the assignments and final exam.
Criteria for L.O. #3				

Ethics	Assessment performance shows limited understanding of what ethics is.	Assessment performance shows an understanding of what ethics involves relating to sustainability and the environment.	Assessment performance shows an appreciation of the impact of ethics on professional practice as well as ethical decision making relating to sustainability and the environment.	Assessment performance shows a deep appreciation of the impact of ethics on professional practice as well as ethical decision making relating to sustainability and the environment.
Criteria for L.O. #4				
Use of modeling tools	Assignment and exam performance shows limited understanding of data analysis and data modelling techniques and tools for introductory level database design and requirements specification.	Assignment and exam performance shows basic understanding and ability to use data analysis and modeling tools.	Assignment and exam performance shows good understanding of data analysis and modeling tools in conceptual database design.	Assignment and exam performance shows depth of understanding of data analysis and modeling tools.

Grading

For each task, those standards translate into a mark and the different component marks are added up. The final mark for the unit will be calculated by combining the marks for all assessment tasks according to the percentage weightings shown in the assessment summary. You will then be given a grade that reflects your achievement in the unit.

- **Fail (F)**: does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

- **Pass (P)**: provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; and communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

- **Credit (Cr)**: provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.

- **Distinction (D)**: provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and

concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

- **High Distinction (HD)**: provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

Assessment Tasks

Name	Weighting	Hurdle	Due
Workshop Attendance	10%	No	Weeks 2-13
Assignment1:Database Modelling	15%	No	1/09/2017 Friday at 5:00 PM
Assignment2:Database Queries	15%	No	6/10/2017 Friday at 5:00 PM
Assignment 3: DB Issues&Topics	10%	No	In week 12 and 13 tutorials
Final Exam	50%	Yes	See Exam Timetable

Workshop Attendance

Due: **Weeks 2-13**
Weighting: **10%**

Workshops are combined practicals and tutorials. Each week your attendance will be recorded in your scheduled workshop and you will receive 1 mark for attendance & active participation. The total attendance mark is limited to 10 throughout the semester.

On successful completion you will be able to:
- Analyse data requirements and design and develop conceptual database models.
- Implement system models into databases, design and create simple databases for business information systems and write programs to produce interactive queries.
- Explain the role and nature of ethics and sustainability in the IT environment.
- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Assignment1:Database Modelling

Due: **1/09/2017 Friday at 5:00 PM**

Weighting: **15%**

This assignment will involve the development of a conceptual, logical and physical data model for a given problem description.

On successful completion you will be able to:

- Analyse data requirements and design and develop conceptual database models.
- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Assignment2:Database Queries

Due: **6/10/2017 Friday at 5:00 PM**
Weighting: **15%**

This assignment involves the design and execution of database queries to demonstrate knowledge of SQL

On successful completion you will be able to:

- Implement system models into databases, design and create simple databases for business information systems and write programs to produce interactive queries.

Assignment 3: DB Issues&Topics

Due: **In week 12 and 13 tutorials**
Weighting: **10%**

This assessment involves the presentation of a problem, possible solutions and a recommended solution relating to the lecture topics in Weeks 8-12.

On successful completion you will be able to:

- Explain the role and nature of ethics and sustainability in the IT environment.

Final Exam

Due: **See Exam Timetable**
Weighting: **50%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Final Exam

On successful completion you will be able to:

- Analyse data requirements and design and develop conceptual database models.
- Implement system models into databases, design and create simple databases for

business information systems and write programs to produce interactive queries.

- Explain the role and nature of ethics and sustainability in the IT environment.
- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Delivery and Resources

ISYS114 is taught via lectures, tutorials and practicals. The feedback that you receive also plays an important role in your learning. Make sure you read the feedback you are given, attend lectures which provide assignment feedback and compare your solution with sample solutions provided.

Lectures are used to introduce new material, provide motivation and context for your study, guide you in what is important to learn and explain more difficult concepts.

Tutorials and practicals are small group classes which give you the opportunity to interact with your peers and with a tutor who has a sound knowledge of the subject. This also gives you a chance to practice your technology skills.

You have many opportunities to seek for and to receive feedback. During lectures, you are encouraged to ask the lecturer questions to clarify anything you might not be sure of. You may also arrange to meet with your tutor or the lecturer or attend the consultation hours of any tutor. Each week, you will be given activities and problems to solve in the tutorials and practicals. This will at times involve contributing to a group of students and presenting solutions to the class. The final assignment involves working in pairs and giving a presentation in your tutorial class. The comments and the solutions provided will help you to understand the material in the unit, prepare you for the work in assignments as well as for the final exam. It is important that you keep up with these problems every week. Assignments have been especially designed to deliver continuous feedback on your work.

Each week you should:

- Attend lectures, take notes, ask questions
- Attend your tutorial/practical and seek feedback from your tutor on your work
- Read assigned reading material (ideally before the lecture), add to your notes and prepare questions for your lecturer or tutor
- Start working on any assignments immediately after they have been released.

Lecture notes are made available each week but these notes are intended as an outline of the lecture only and are not a substitute for your own notes or reading of the textbook or other additional material.

Classes

Lectures

There are 2 hours of lectures per week.

1. Day Lectures: Tuesday 2-4pm in E7B Mason Theatre,
2. Evening Lectures: Monday 6-8 pm in X5B T1.

Each week you should attend two hours of lectures (or watch the recorded lecture), and a 2 hour Workshop (including a tutorial and a practical). For details of days, times and rooms consult the ti metables webpage.

Note that tutorials and practicals commence in week 2.

Please note that you should submit two assignments and give a presentation in the workshop and attend the tutorials and practicals. These activities are designed to help you learn the unit material and choosing not to do these activities may result in you failing the unit.

Resources to assist your learning

iLecture

Digital recordings of lectures are available through the web page of the unit on ilearn.

Textbook

The textbook for ISYS114 this semester is:

Modern Database Management,

- Author(s): Jeffrey A. Hoffer; Ramesh Venkataraman; Heikki Topi
- Publisher: Pearson
- Copyright year: © 2016
- Edition: 12th
- Print ISBN: 9780133544619, 0133544613
- eText ISBN: 9780134402109, 0134402103

https://www.vitalsource.com/referral?term=9780134402109

Technology

MS Word, PowerDesigner, SQLDeveloper

Websites

The web page for this unit can be found at http://ilearn.mq.edu.au/course/view.php?id=29757

Discussion Boards

The unit makes use of discussion boards hosted within iLearn. Please post questions of general interest there (for example, about assessment tasks), they are monitored by the unit staff but students may also provide answers.

Unit Schedule

Day lectures will be held on Tues 2-4pm E7B in Mason Theater. Evening lectures will be held on

Mon 6-8pm in X5B T1.

In the table below, for each week, the lecturer, the topics to be covered and the textbook references are given.

Week	Lecturer	Topic	Reading/Chapter
1	Hanna	Introduction to unit and databases	Hoffer 1
2	Ramakrishnan	Conceptual Data Modelling	Hoffer 2-3
3	Ramakrishnan	Logical Data Modelling	Hoffer 4
4	Ramakrishnan	Physical Data Modelling	Hoffer 5
5	Ramakrishnan	Introduction to SQL, Introduction to Assignment 2 Assignment1 due	Hoffer 6
6	Ramakrishnan	Introduction to SQL	Hoffer 6
7	Ramakrishnan	Advanced SQL Feedback on Assignment 1	Hoffer 7
8	Hanna	Database Development I: Database Application Development and Data Warehousing Assignment 2 due	Hoffer 8-9
9	Hanna	Data Quality and Integration	Hoffer 10
10	Hanna	Advanced Database Topics I: Data and Database Administration Feedback on Assignment 2	Hoffer 12, online Hoffer 13
11	Hanna	Big Data and Analytics	Hoffer 11
12	Hanna	GreenIT Presentations in Tutorials	See online material
13	ALL	Revision, Exam Preparation Presentations in Tutorials	

Learning and Teaching Activities

Lectures

Lectures from staff in the class

Workshops

Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment

Assignment submission

Submission of assignments related to specific tasks

Presentation preparation and delivery

Preparation of a topic and presentation in workshop classes in pairs

Final Examination

Assessment of individual learning

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they

are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcome

- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Assessment tasks

- Assignment1:Database Modelling
- Final Exam

Learning and teaching activities

- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcome

- Explain the role and nature of ethics and sustainability in the IT environment.

Assessment tasks

- Assignment 3: DB Issues&Topics
- Final Exam

Learning and teaching activities

- Preparation of a topic and presentation in workshop classes in pairs

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- Explain the role and nature of ethics and sustainability in the IT environment.

Assessment tasks

- Assignment 3: DB Issues&Topics
- Final Exam

Learning and teaching activities

- Preparation of a topic and presentation in workshop classes in pairs

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Analyse data requirements and design and develop conceptual database models.
- Implement system models into databases, design and create simple databases for business information systems and write programs to produce interactive queries.
- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Assessment tasks

- Workshop Attendance
- Assignment1:Database Modelling
- Assignment2:Database Queries
- Final Exam

Learning and teaching activities

- Lectures from staff in the class
- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment
- Submission of assignments related to specific tasks
- Assessment of individual learning

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Analyse data requirements and design and develop conceptual database models.
- Implement system models into databases, design and create simple databases for business information systems and write programs to produce interactive queries.
- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Assessment tasks

- Workshop Attendance
- Assignment1:Database Modelling
- Assignment2:Database Queries
- Final Exam

Learning and teaching activities

- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment
- Submission of assignments related to specific tasks
- Preparation of a topic and presentation in workshop classes in pairs
- Assessment of individual learning

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Analyse data requirements and design and develop conceptual database models.
- Implement system models into databases, design and create simple databases for business information systems and write programs to produce interactive queries.
- Explain the role and nature of ethics and sustainability in the IT environment.

Assessment tasks

- Assignment1:Database Modelling
- Assignment2:Database Queries

- Assignment 3: DB Issues&Topics
- Final Exam

Learning and teaching activities

- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment
- Submission of assignments related to specific tasks

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Analyse data requirements and design and develop conceptual database models.
- Explain the role and nature of ethics and sustainability in the IT environment.
- Use data analysis and data modelling techniques and tools for introductory level database design and specification

Assessment tasks

- Workshop Attendance
- Assignment1:Database Modelling
- Assignment 3: DB Issues&Topics
- Final Exam

Learning and teaching activities

- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment
- Submission of assignments related to specific tasks
- Preparation of a topic and presentation in workshop classes in pairs

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social

justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcome

- Explain the role and nature of ethics and sustainability in the IT environment.

Assessment tasks

- Assignment 3: DB Issues&Topics
- Final Exam

Learning and teaching activities

- Lectures from staff in the class
- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment
- Preparation of a topic and presentation in workshop classes in pairs
- Assessment of individual learning

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Explain the role and nature of ethics and sustainability in the IT environment.

Assessment tasks

- Assignment 3: DB Issues&Topics
- Final Exam

Learning and teaching activities

- Lectures from staff in the class
- Tutorials and practicals supervised by tutors to provide personalised feedback and an interactive learning environment
- Preparation of a topic and presentation in workshop classes in pairs
- Assessment of individual learning

Changes from Previous Offering

Please see the passing requirements for the unit at the end of the Assessment Section under

"Grading". Note the existence of a hurdle requirement (the final exam).

We are using edition 12 textbook rather than edition 11. Students may still use edition 11 if they have already purchased it.