School of Electrical and Information Engineering
University of the Witwatersrand, Johannesburg
ELEN7045 – SD Methodologies, Analysis and Design

Course Brief and Outline: 2014

Course Co-ordinator

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Course homepage: TBA
A calendar for the course is available on Google Calendar and for download (ics format). Note that the calendar may change.

1 Course Background and Purpose

This course is aimed at students with an interest in developing modern computer software. Software design is presented within the context of the software engineering process. The focus is on the practical aspects of modern object-oriented analysis and design techniques. Students are required to have had some previous experience in constructing object-oriented applications and *be able to program comfortably in a mainstream object-oriented language*.

2 Course Outcomes

Students successfully completing this course should be able to:

- Describe and discuss fundamental and intermediate object-oriented programming (OOP) concepts and principles;
- Describe and discuss the issues and problems addressed by Software Engineering and how OOP design addresses these problems;
- Analyse and document the requirements for a software application;
- Design and implement OOP software applications that are well designed, readable and cater for change;
- Read and use an OOP notation;

3 Course Content

The formal part of the course consists of a number of lectures. The material to be covered in these will include, but is not limited to, the following:

1. Requirements Elicitation: Use Cases, User Stories, Specification by Example, Test-Driven Development

2. Object-oriented Concepts: Classes and objects, Inheritance, Containment, Polymorphism, Message passing.
3. Object-oriented Analysis and Design: CRC cards; SOLID Principles, Design Patterns, Domain-Driven design and Refactoring.
4. Object-oriented Design (OOD) Notation: The UML notation will be presented.

4 Prior Knowledge Assumed

It is assumed that students are able to program comfortably in a mainstream object-oriented language, and are familiar with fundamental OO concepts such as information hiding and encapsulation, interfaces and implementations, and inheritance and polymorphism.

5 Assessment

The components of assessment and their weightings are as follows:

Component	Weighting
In-Class Presentations	10%
Discussions on Readings	10%
First Assignment	20%
Second Assignment	20%
Project	40%

The *minimum criteria* for passing this course are:

- A passing grade for at least one assignment
- A passing grade for the course project

5.1 In-Class Presentations

Student groups will be required to make short presentations to the class during the course. These presentations count for relatively few marks and should be seen as formative assessment.

5.2 Discussions on Readings

A number of articles, book chapters, and so on, are required reading for this course. They serve to broaden and/or deepen the material covered in lectures. These readings will be discussed in an online forum and students are required to participate.

5.3 Assignments

Assignments will require self-study in order to be adequately tackled. They will involve software development and/or report writing.

5.4 Project

The course project will require students to work together in groups in order to design and construct a software application. This project will be carried out over a number of weeks and counts for the majority of the course marks. Students will be required to present their work on the project as well as submit appropriate documentation and source code.

6 Teaching and Learning Process

6.1 Teaching and Learning Approach

Lectures will be used to introduce and discuss the key concepts of the course, but these concepts will need to be reinforced through self-study, discussion with other students, and practical application (by writing code). From time to time, additional material will be handed out or referred to.

6.2 Consultation

Consultation outside of times set aside for lectures is strictly by appointment only.

7 Information to Support the Course

7.1 Prescribed Text/Readings

There are no prescribed texts that need to be purchased for this course. All required reading, and additional references, will be made available on the course homepage. Some of the recommended books will be available on short loan from the engineering library.

8 Other Information

8.1 Administrative details

Further information regarding the course will be communicated through announcements in lectures and updates of the course homepage.

All students are expected to regularly consult the homepage.