

Tutorial Letter 101/3/2018

Advanced Systems Development (Information Systems) INF 3705

Semester 1 & 2

School of Computing

IMPORTANT INFORMATION:

Please activate your *myUnisa* and *myLife* email addresses and ensure you have regular access to the *myUnisa* module site as well as your group site.

Please note: This is an online module, and therefore your module is available on myUnisa. However, in order to support you in your learning process, you will also receive some study materials in printed format.

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1 INTRODUCTION

Dear Student

We welcome you to the module Advanced Systems Development (INF 3705). The purpose of this module is to provide you as the qualifying student with advance level knowledge, specific skills and applied competencies in systems analysis and design. These competencies will equip you to use concepts to analyse and design high-quality systems in organizations and contribute to the development of the information systems or computer science field in South Africa or in any other country. This module forms part of the BCom (Information Systems) or BSc (Information Systems or Computer Science) degree and you are expected to have a computer and internet connectivity in order to pass this module.

Do not hesitate to contact your lecturer (on *myUnisa*, by e-mail or by telephone) if you are experiencing problems with the content of this tutorial letter or any aspect of the module. I sincerely hope that you find this module, as well as your online learning experience interesting and rewarding and trust that you will complete the module successfully.

Because this is a fully online module, you need to use *myUnisa* to study and complete the learning activities for this course. You need to visit the websites on *myUnisa* for INF 3705 frequently. The website for your module is INF3705-18-S1 for semester 1 students and INF3705-18-S2 for semester 2 students

1.1 To get started ...

Because this is a fully online module, you need to go online to see your study materials and read what to do for the module. Go to the website: <https://my.unisa.ac.za> and login with your student number and password. You will see INF3705-18-S1 or INF3705-18-S2 in the row of modules in the orange blocks across the top of the webpage. Remember also to check in the more-tab if you cannot find it in the orange blocks. Click on the module you want to open.

The textbook for this module is: **Sommerville, I. 2016. *Software engineering*. 10th edition/GLOBAL edition: ISBN 10: 1-292-09613-6 or ISBN 13:978-1-292-09613-1**

We wish you success on your journey!

2 MODULE FORMAT: INF3705

2.1 Fully online module

Please note that this module is offered fully online.

All study material for this module will be available on *myUnisa*. It is thus very important that you register on *myUnisa* and access the module site on a regular basis. You must be registered on *myUnisa* to be able to access your learning material, submit your assignments, gain access to various learning resources, “chat” to your lecturer or teaching assistant and fellow students about your studies and the challenges that you might encounter, and to participate in online discussion forums and blogs. Importantly, *myUnisa* contains the **additional material tool** from

which you will be able to access the study material for this module if you have registered and have access to *myUnisa*.

2.2 Printed materials to support the online module

Because we want you to be successful in this online module, we also provide you with some of the study materials in printed format. This will allow you to read the study materials, even if you are not online.

In addition, you will receive this tutorial letter and a printed copy of the online study materials from myUnisa. These printed materials are exactly the same as the online ones as they have been copied and printed from the *myUnisa* website.

Remember, the printed support materials are a backup to everything that is found online, on myUnisa. There are no extra things there. **In other words, you should NOT wait for the printed support materials to arrive to start studying.**

Please consult the *Study@ Unisa* publication for more information on the activation of your *myLife* email address as well as obtaining access to the *myUnisa* module site.

3 LECTURER AND CONTACT DETAILS

3.1 The primary lecturer for this module is Prof Alfred Coleman:

School of Computing
College of Science, Engineering and Technology
Tel: + 27 116709108
e-mail:colema@unisa.ac.za

To contact the University, you should follow the instructions in the ***Study @ Unisa*** brochure. Remember to have your student number available when you contact the University.

When you contact your lecturer, please do not forget to always include your student number. This will help your lecturers to assist you.

4 ASSESSMENT

4.1 Assessment plan

Here is a breakdown of the formal portfolio assignments, as they occur in the semester.

There are two assignments for this module. To gain examination admission to examination you need to complete and submit assignment 1. To receive a year mark you need to complete and submit both assignments, that is, Assignments 01 and 02.

We do advise you to complete all the assignments to cover the content matter before the examinations.

4.1.1 Syllabus table of content

Chapter 1: Introduction_ Software Engineering

Chapter 2: Software processes

Chapter 3: Agile software development
 Chapter 4: Requirements engineering
 Chapter 5: System modeling
 Chapter 6: Architectural design
 Chapter 7: Design and Implementation
 Chapter 8: Software testing
 Chapter 9: Software Evolution
 Chapter 10: Dependable Systems
 Chapter 11: Reliability engineering
 Chapter 12: Safety Engineering
 Chapter 15: Software Reuse
 Chapter 18: Service-oriented Software Engineering
 Chapter 19: Systems engineering

Assignment 1 covers chapters 1- 8 and Assignment 2 cover chapter 9- 19

4.1.2 Unique assignment numbers

Assignment number	Unique assignment number Semester 1	Unique assignment number Semester 2
01	690100	66217
02	84610	750580

4.1.3 Due dates for assignments

Assignment number	Due date Semester 1	Due date Semester 2	Purpose
01	6 March 2018	21 August 2018	Compulsory- In-depth understanding of the module
02	6April 2018	18 September 2018	Compulsory – In-depth understanding of the module

4.1.4 Submission of assignments

4.1.4.1 Electronic submission of an assignment

For detailed information on assignments, please refer to the *Study @ Unisa* brochure, which you received with your study package. To submit an assignment via myUnisa:

- Go to myUnisa.
- Log in with your student number and password.
- Select the module.
- Click on “Assignments” in the menu on the left-hand side of the screen.
- Click on the assignment number you wish to submit.

Follow the instructions.

Assignments

Written assignments

Assignment 01 and assignment 02 are written assignments. They should be posted to Unisa or uploaded on the myUnisa website. Assignment 01 is used to determine your admission to the examination. Both assignment 01 and 02 are used to determine your year mark.

Year mark

Each module leader may decide which assignments will count towards the year mark. For INF3705 you will receive a possible mark out of 20, which will count towards your final mark for the year. **For this module, Assignment 01 and 02 will be used to calculate your year mark.**

Do not hesitate to contact your lecturer by email if you are experiencing problems with the content of this tutorial letter or any aspect of the module.

I wish you a fascinating and satisfying journey through the learning material and trust that you will complete the module successfully.

Enjoy the journey!

Prof Alfred Coleman

Semester 1: Assignment 01: 2018**[For first semester students only]**Due date: 06 **March 2018**

Prescribed

Answer these questions

Unique Number: 690100

Total: **100**

Question 1

[15]

What is the most important difference between generic software product development and custom software development? What might this mean in practice for users of generic software products?

Question 2

[15]

Software engineering is not only concerned with issues like system heterogeneity, business and social change, trust, and security, but also with ethical issues affecting the domain. Give some examples of ethical issues that have an impact on this domain

Question 3

[15]

Compare and contrast the Scrum approach to project management with conventional plan-based approaches. Your comparison should be based on the effectiveness of each approach for planning the allocation of people to projects, estimating the cost of projects, maintaining team cohesion and managing changes in project team membership

Question 4

[15]

Suggest how an engineer responsible for drawing up a system requirements specification might keep track of the relationships between functional and non-functional requirements

Question 5

[10]

When describing a system, explain why you may have to design the system architecture before the requirements specification is complete

Question 6

[15]

Testing is intended to show that a program does what it is intended to do. Why may testers not always know what a program is intended to do?

Question 7

[15]

What do you understand by the term 'stress testing'? Suggest how you might stress test a Mentcare system

Semester 1: Assignment 02: 2018**[For first semester students only]****Due date: 06 April 2018****Prescribed****Answer these questions****Unique Number: 84610****Total: 100**

Question 1 [10]

Explain how advances in technology can force a software subsystem to undergo change or risk becoming useless.

Question 2 [15]

What are the strategic options for legacy system evolution? When would you normally replace all or part of a system rather than continue maintenance of the software

Question3 [15]

Explain why it is reasonable to assume that the use of dependable processes will lead to the creation of dependable software

Question 4 [10]

What is the common characteristic of all architectural styles that are geared to supporting software fault tolerance?

Question5 [15]

List four types of systems that may require software safety cases, explaining why safety cases are required.

Question 6 [10]

How does the base application's design in the product line simplify reuse and reconfiguration?

Question 7 [15]

What are the significant benefits offered by the application system reuse approach over the custom software development approach?

Question8 [10]

Giving reasons for your answer, suggest two important types of application where you would not recommend the use of service-oriented architecture

Semester 2: Assignment 01: 2018**[For second-semester learners only]**

Due date: 21 August 2018

Prescribed:

Unique number: 66217

Total: **100**

Question1 [10]

Briefly discuss why it is usually cheaper in the long run to use software engineering methods and techniques for software systems

Question2 [10]

Based on your own knowledge of some of the application types discussed in section 1.1.2, explain, with examples, why different application types require specialized software engineering techniques to support their design and development.

Question3 [10]

Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process.

Question4 [15]

Explain why change is inevitable in complex systems and give examples (apart from prototyping and incremental delivery) of software process activities that help predict changes and make the software being developed more resilient to change

Question5 [15]

Explain how the principles underlying agile methods can lead to the accelerated development and deployment of software.

Question 6 [15]

Extreme programming expresses user requirements as stories, with each story written on a card. Discuss the advantages and disadvantages of this approach to requirements description

Question7 [15]

The way in which a system boundary is defined and an appropriate context model is created may have serious implications on the complexity and cost of a project. Give two examples where this may be applicable

Question8 [10]

Based on your experience with a bank ATM, draw an activity diagram that models the data processing involved when a customer withdraws cash from the machine

Semester 2: Assignment 02: 2018**[For second semester students only]**

Due date: 18 September 2018

Unique number: 750580

Total: **100**

Question 1 [15]

Some software subsystems are seen as “low quality, high business value.” Discuss how those subsystems can be re-engineered with minimal impact on the operations of the organization?

Question 2 [15]

Briefly describe the three main types of software maintenance. Why is it sometimes difficult to distinguish between them?

Question 3 [15]

Suggest six reasons why software dependability is important in most sociotechnical systems

Question 4 [15]

What is the common characteristic of all architectural styles that are geared to supporting software fault tolerance?

Question 5 [15]

List four types of systems that may require software safety cases, explaining why safety cases are required?

Question 6 [15]

Analyze the benefits of software reuse and explain why the expected lifetime of the software should be considered when planning reuse

Question 7 [10]

What is a workflow? List out the key stages in the process of system construction by composition.