NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
MAY EXAMINATIONS 2005

SUBJECT: SOFTWARE METHODOLOGY
CODE: SCS5205

INSTRUCTION TO CANDIDATES

This examination paper consists of seven(7) questions, all questions carry equal marks.
Answer any FIVE (5) questions

Time: 3 hours

QUESTION ONE

a) "Plans are nothing. Planning is everything." The idea is that a written schedule and allocation of resources is not useful if it is not updated to reflect how time and other resources are spent, and the new status of resources available and spent, time elapsed, work remaining, and new work that had not been anticipated. With the aid of an appropriate example, explain why this is the case. [8]

b) State any six reasons why software is delivered late? [6]

c) Why are software life cycle models called "models"? What are they a "model" of? [6]

QUESTION TWO

a) How does the Spiral model subsume prototyping, incremental development, and the Waterfall model? [8]

b) Software maintenance increases system entropy. Discuss this statement. In your discussion highlight the possible ways to counteract this effect. [8]

c) What are the two major components of an STD? [4]

QUESTION THREE

a) Define each of the following terms and explain how each concept is relevant to the design *process*:
   i) Information hiding,
   ii) Abstraction,
   iii) Encapsulation,
   iv) Inheritance,
   v) Polymorphism. [10]

b) The Chief Executive of Dube & Co. Soft Systems has heard that over 70% of the development time and costs plus running costs of some computer-based systems are committed to software maintenance.
   You are required to draft a report to the Chief Executive describing the three types of software maintenance, which are commonly encountered in computer-based systems. [10]

QUESTION FOUR

a) Without drawing them, explain what information is conveyed by:
   i) Class diagrams,
   ii) State diagrams, and
   iii) Interaction diagrams.
   What is the purpose of each type of diagram in the context of design and analysis? [9]

b) What is a PERT chart and what is a Gantt chart? What is the purpose of each? For what sort of information is each one better suited? [8]

c) Why are levelled DFDs important in a system model? [3]

QUESTION FIVE

a) What are the problems and limitations associated with traditional analysis, design and programming techniques? [6]

b) Why are object-oriented approaches seen by many as superior? [6]

c) A change in a program specification will normally be carried through into changes to the program design and then changed code. What other products may need to be modified and why? [8]

QUESTION SIX

a) List the tactical actions that you would expect a project manager to undertake.
In practice, a project manager needs to manage simultaneously the elements of cost, time, resources (including people) and quality. The elements not only interact with each other but also are continuously changing.
   i) Briefly explain the role of each of these elements in the project management process. [5]
   ii) Give examples of the type of judgements and decisions, which the project manager may be required to make. [3]

b) With the aid of examples distinguish between the following terms:
   i) Context diagram and Data Flow diagram [4]
   ii) Milestone and deliverable [4]
   iii) Functional and non-functional requirements [4]

QUESTION SEVEN

a) Discuss the main concerns in installing new software from the point of view of a software project manager. [4]

b) Give an account of the information that should be found in a requirements specification document. [10]

c) In describing what RAD is all about some researchers have been trying to rename it as Really Awful Design or Rapidly Accumulating Defects. With reference to what you know about RAD, discuss these views. [6]

END OF QUESTION PAPER