NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE
2013-14 ACADEMIC YEAR
PART II - FIRST SEMESTER EXAMINATIONS – DECEMBER 2013
AAR 2103 – COMPUTER AIDED ARCHITECTURAL DESIGN 1

Instructions ***Duration: 4 Hours***

Answer ALL questions
Question 1 to be completed in the answer book provided, while Question 2 will be completed on the PC.
Make sure that you save your work at least every 5 minute interval.
Do not leave your PC/Workstation until your drawing has been collected on a flash disk by the Invigilator

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QUESTION 1

a. Using appropriate examples, discuss the advantages and disadvantages of using Computer Aided Design technologies in Architecture **[10]**

QUESTION 2

The exercise consists of an accurate design of a two bedroomed house. The general floor layout of the house is saved on your computer as an AutoCAD drawing (Drawing 1.dwg) including window, door and furniture in AutoCAD blocks in your drawing.

STEP 1:

a. Open the drawings on your computer Desktop and save it under the name [STUDENT NUMBER] CAAD01/2013.

b. Set the Layers, Text Styles, Line types, Dimensions as you may need for reproducing the given drawing

STEP 2:

a. Redraw the FLOOR PLAN with all dimensions, hatching and relevant notes as shown on the attached appendix 1. **[35]**

STEP 3:

a. Design and draw the Section Y-Y, and the North and West Elevations that are commensurate with floor plan, with all necessary notes and windows as shown in Appendix 1.

Section Y-Y	(15)
North, South, East & West Elevations	(30)
	[45]

b. Write notes with TEXT STYLE of your choice. **[10]**

MODEL ANSWER FOR QUESTION 1

Modeling with Computer Aided Design (CAD) systems offers a number of advantages over traditional drafting methods that use rulers, squares, and compasses. For example, designs can be altered without erasing and redrawing. CAD systems also offer "zoom" features analogous to a camera lens, whereby a designer can magnify certain elements of a model to facilitate inspection. Computer models are typically three dimensional and can be rotated on any axis, much as one could rotate an actual three dimensional model in one's hand, enabling the designer to gain a fuller sense of the object. CAD systems also lend themselves to modeling cutaway drawings, in which the internal shape of a part is revealed, and to illustrating the spatial relationships among a system of parts.

To understand CAD it is also useful to understand what CAD cannot do. CAD systems do not yet have means of comprehending real-world concepts, such as the nature of the object being designed or the function that object will serve. CAD systems function by their capacity to codify geometrical concepts. Thus the design process using CAD involves transferring a designer's idea into a formal geometrical model.

In *CADCAM: From Principles to Practice* , Chris Mc-Mahon and Jimmie Browne summarize limitations of existing CAD/CAM systems as follows: "There is a widespread view that CAD is not yet adequate as an aid to the designer in generating a design. CAD is considered to concentrate rather too much on providing means of representing the final form of the design, whereas designers also need a continual stream of advice and information to assist in decision making….

The tasks of CAD systems of the future are therefore to represent a wider variety of a design's properties, in terms that are familiar to designers and of a company's organization and equipment that influence design." Other limitations to CAD are being addressed by research and development in the field of expert systems. This field derived from research done on artificial intelligence and expert systems.

Expert systems might also come to change the way data is stored and retrieved in CAD systems, supplanting the hierarchical system with one that offers greater flexibility. One of the key areas of development in CAD technologies is the simulation of performance. Dynamics tests function as a complement or substitute for building working prototypes. This is a field that continues to advance as witnessed by the development of the 3D Printer, which, given the necessary parameters, theoretically can mould virtually any 3D form.

Through applications such as BIM (Building Information Modeling) and Teamwork options, the ease with which a part's specifications can be changed, and work coordinated among several parties to the same project facilitates the development of optimal dynamic efficiencies, both as regards the functioning of a system of parts and the manufacture of any given part. Simulation allows for rapid testing of various component configurations. The processes of design and manufacture are, in some sense, conceptually separable. Yet the design process must be undertaken with an understanding of the nature of the production process. It is necessary, for example, for a designer to know the properties of the materials with which the part might be built, the various techniques by which the part might be shaped, and the scale of production that is economically viable.

The conceptual overlap between design and manufacture is suggestive of the potential benefits of CAD and CAM (Computer Aided Manufacturing) and the reason they are generally considered together as a system. Recent technical developments have fundamentally impacted the utility of CAD/CAM systems. For example, the ever-increasing processing power of personal computers has given them viability as a vehicle for CAD/CAM application. Another important trend is toward the establishment of a single CAD standard, so that different data packages can be exchanged without manufacturing and delivery delays, unnecessary design revisions, and other problems that continue to bedevil some CAD initiatives. Finally, CAD-CAM software continues to evolve on a continuing basis in such realms as visual representation and integration of modeling and testing applications.

The data forms that the universal currency in CAD systems are easily transferable as well as defy distance, using disks and the internet, thus making them vulnerable to alteration through hacking and viruses as well as theft.