



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ARCHITECTURE & BUILT ENVIRONMENT

UNIVERSITY EXAMINATION FOR:
BACHELOR OF ARCHITECTURAL STUDIES
EAR 4302: BUILDING ENVIRONMENTAL SCIENCE II
(LIGHTING DESIGN)

END OF SEMESTER EXAMINATION

YEAR THREE SEMESTER ONE

SERIES: DECEMBER 2024

TIME: 2 HOURS

DATE: DECEMBER, 2024

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (30 MARKS) - COMPULSORY

- a) With the aid of a sketch, explain light shelves as utilized in daylighting. (10 marks)
- b) Explain the relationship between light, space and human beings. (6 marks)
- c) Distinguish between shading coefficient and visible transmittance. (4 marks)
- d) With the aid of clear sketches, explain the layered approach in lighting design. (10 marks)

QUESTION TWO (20 MARKS)

You have been tasked to design a passive and low energy building for the school of Architecture. Explain the strategies to be employed to achieve energy efficient lighting bearing in mind that the building is utilized 24 hours. (20 marks)

QUESTION THREE (20 MARKS)

With the aid of sketches, explain the daylight factor components. (20 marks)

QUESTION FOUR (20 MARKS)

The class has been tasked to undertake the lighting design for the internal and external spaces of a proposed campus located in Garissa. Explain the design considerations to be employed.

QUESTION FIVE (20 MARKS)

Visual comfort is a subjective impression that depends on a combination of physical parameters. Discuss. (20 marks)