



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS FOR THE DEGREE IN RENEWABLE ENERGY,  
TECHNOLOGY AND MANAGENT**

**4<sup>TH</sup> YEAR 1<sup>ST</sup> SEMESTER 2018/2019 ACADEMIC YEAR**

**CENTRE: MAIN CAMPUS**

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**COURSE CODE: TET 3415**

**COURSE TITLE: ENERGY AND BUILT ENVIRONMENT**

**EXAM VENUE: STREAM: BSc REN ENERGY TECH. & MGT.**

**DATE: ../12/2018 EXAM SESSION:**

**DURATION: 2 HOURS**

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### **Instructions**

- 1. Answer question 1 (Compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**



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~~UNIVERSITY EXAMINATIONS FOR THE DEGREE OF SCIENCE IN RENEWABLE  
ENERGY TECHNOLOGY AND MANAGEMENT~~

~~FOURTH YEAR FIRST SEMESTER ACADEMIC YEAR 2017/2018~~

~~CENTRE: MAIN CAMPUS~~

~~TET 3415: Energy and Built Environment~~

~~TIME 2 HOURS~~

**Instructions to the candidates**

**The exam contains FIVE questions.**

**Answer Question One and any other Two Questions**

**QUESTION ONE (COMPULSORY)**

- Describe energy and built environment. (3 marks)
- What is energy conservation? (1 mark)
- State and explain various passive solar energy systems. (10 marks)
- As an upcoming energy expert, describe what ~~or how~~ tomorrow's energy efficient building should have? (5 marks)
- Describe design objectives of a whole building design. (8 marks)
- What does optimization of energy efficiency mean? (3 marks)

**QUESTION TWO**

- State the general expression for the energy balance as used in energy conservation. (1 mark)
- Describe the concept of intelligent lighting as used in energy and built environment. (5 marks)
- Describe the three optimization control measures studied in this course. (6 marks)
- Describe intelligent energy efficient buildings. (8 marks)

### **QUESTION THREE**

- a. State two major aspects that matter during the planning of technical services and logistics for building systems. (2 marks)
- b. Describe either four of the principles of energy efficiency building system. (8 marks)
- c. Discuss the concept of passive energy system as used in this course. (4 marks)
- d. Describe triple bottom line goals as far as buildings ~~and building~~ efficiency is concerned. (6 marks)

### **QUESTION FOUR**

- a. From energy and environmental building concept standpoint, describe the strategy for design involved. (6 marks)
- b. How can unwanted energy flows with too much energy leaving or entering building via windows be corrected? (3 marks)
- c. As an upcoming renewable energy, describe how you can achieve cost-effectiveness from energy conservation measures? (5 marks)
- d. State and explain the key characteristics of at least two buildings in Kenya that have embraced green energy technologies. (6 marks)

### **QUESTION FIVE**

- a. Under criteria for architectural, mechanical, electrical and building system components describe the following:
  - i. Site and building orientation. (10 marks)
  - ii. Envelope and façade design. (3 marks)
  - iii. Daylight and lighting analysis. (2 marks)
- b. Bondo County government housing department has invited all stakeholders in the building industry: owners, occupants and entire society to deliberate on the need for efficient buildings. Explain the benefits of efficient buildings to all this stakeholders. (5 marks)