|  |  |
| --- | --- |
| http://sphotos-b.ak.fbcdn.net/hphotos-ak-ash4/207708_521084724588980_1701670057_n.png  **TECHNICAL UNIVERSITY OF KENYA**  **SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCES** | |
| **Document: COURSE OUTLINE** | |
| **COURSE CODE:** ECSI 3102; ECCI 3102; ECII 3102 **COURSE TITLE:**LINEAR ALGEBRA | |
| Date Issued**:**10th Jan. 2022 | REV NO: Nil |
| ACADEMIC YEAR:2021/2022 | SEMESTER: I |
| Issued by:Dr. KIRATU B.N | Authorized by: ATL: Dr. Obiero |

|  |
| --- |
| **Purpose of the course:**  The course serves as an introduction to basic concepts in Linear Algebra which is a branch in mathematics that has several applications in physical sciences, engineering, economics, computer technology and many others.  **Expected Learning Outcomes**  The learner should be able to:   1. Carry out basic operations on Matrices. 2. Find solutions to systems of Linear Equations and their applications. 3. Understand properties of vector spaces and vector algebra. 4. Understand basic properties and examples of linear transformations. |
| **Course Content**  Linear equation and matrices: Basic operations on matrices, determinant and inverse of matrices, Reduction to echelon form, solution to systems of linear equations using Gauss-Jordan elimination method, Cramer’s rule and inverses; Inner products and norms, Vector analysis; Scalars and vectors addition, subtraction and multiplication of vectors, Differentiation of vectors.dot and cross products, equation of planes and lines; Linearity: Linear dependence and independence of vectors; Eigen value and Eigen vector, linear transformations, bilinear and quadratic forms |
| **Mode of Delivery**  Lectures, presentations, group discussions ,practical exercises |
| **Instructional materials/Equipment**  Whiteboard ,lecture notes, handouts, projectors, computers |
| **Course Assessment**  **Student’s Performance**  Combination of continuous assessment test(CAT)(minimum of two sit-in tests),individual assignment, Tutorials ,practicals, seminar presentation and end of semester exam.  **Course Evaluation**  Two in class CATS - 20%  Assignments - 10%  Final Examination - 70%  Pass mark - 40%  **Lecturer’s performance**  Observation of the lesson by Head of Department and other lecturers, evaluation forms completed by students. |
| **Recommended Reading Materials**   1. Gilbert Strang,(1988) *Linear Algebra and its applications* ,3rd Edition ,Springer-Verlag New York.      1. Seymor Lipschitz (1968) *Schaum’s Outline of theory and problems of linear algebra*,2nd Edition ,McGraw-Hill companies, Inc. 2. Sheldon Axler, *Linear Algebra done right*,2nd Edition ,Springer-Verlag New York 3. W.H Greub (1967), *Linear Algebra*,1st Edition, Springer-Verlag New York 4. Hoffman and Kunze (1971),*Linear Algebra*,2nd Edition,Prentice-Hall,Inc.   **Journals:**  [**www.iosrjournals.org/**](http://www.iosrjournals.org/)  [**www.tandfonline.com/glma20**](http://www.tandfonline.com/glma20)  [**www.elsevier.com/mathematics/linear**](http://www.elsevier.com/mathematics/linear)  [**www.ilasic.org/**](http://www.ilasic.org/)  [**www.scienceDirect.com**](http://www.scienceDirect.com)  [**www.scirp.org**](http://www.scirp.org) |

**TEACHING SCHEDULE: JANUARY- APRIL 2022**

|  |  |  |
| --- | --- | --- |
|  | **TOPIC AND CONTENT** | **REMARKS** |
| **WEEK 1** | L1:Basic operations on matrices; Addition and Multiplication  L2:Determinant and inverse of matrices |  |
| **WEEK 2** | L1:Reduction to echelon form  L2:Solution to systems of linear equations using Gauss-Jordan elimination method and Cramer’s rule |  |
| **WEEK 3** | L1:Vector spaces and subspaces  L2:Linear dependence and independence of vectors, basis and dimension of vector spaces |  |
| **WEEK 4** | L1&L2:Eigen value and Eigen vector |  |
| **WEEK 5** | CAT 1 |  |
| **WEEK 6** | L1&L2:Inner products and norms |  |
| **WEEK 7** | L2:Scalars and vectors addition, subtraction and multiplication of vectors,dot and cross products |  |
| **WEEK 8** | L1& L2Equation of planes and lines |  |
| **WEEK 9** | linear transformations |  |
| **WEEK 10** | Matrix function ,Special Matrices and Matrix partitioning |  |
| **WEEK 11** | CAT 2 |  |
| **WEEK 12** | Tutorials |  |
| **WEEK 13** | Tutorials |  |
| **WEEK 14 &WEEK 15** | End of Semester Exams |  |

Sign\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class Rep

Sign\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Lecturer

Sign\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ATL