 

**Linear Algebra & Vector Analysis (MATH 1120)**

**Dr. O. Philips Agboola  
Assistant Professor of Mechanical Engineering   
Office: F-092**[**pagboola@ksu.edu.sa**](mailto:pagboola@ksu.edu.sa)**,** [**http://fac.ksu.edu.sa/pagboola**](http://fac.ksu.edu.sa/pagboola)

|  |  |
| --- | --- |
| **Main topics to cover (Topics are given in sequence )** | Introduction of Linear Algebra. Methods for solving the system of linear equations. Matrices and their algebraic properties. Determinants and properties of the determinant functions. Vector Calculus and line and plane in space are learnt. Calculus of vector valued function is introduced. Notions of limit, continuity, differentiability and optimization of function of several variables are studied. |
| **Course Objectives** | 1. To Learn some concepts and methods of system of linear equations 2. To learn properties and solutions of determinants 3. To provide students with a good understanding of the concepts and methods of differentiation, described in detail in the syllabus. 4. To learn about vector Algebra and vector calculus. 5. To learn about the calculus of function of more than one independent variable. |
| **Course Outcomes** | 1. Identify and solve linear systems and find matrix inverses, determinants, eigenvalues and eigenvectors. 2. Classify and solve mathematical problems related to higher order differentiation and higher order partial differentiation based on particularly Product rule, Quotient Rule and Chain Rule. 3. Determine and apply the important quantities associated with scalar fields, such as partial derivatives, the gradient vector and directional derivative. 4. Apply the knowledge for precise descriptions of curves and find lengths, areas, and volumes of curves, surfaces, and solids. 5. Create linkage between linear algebra and other fields both within and without mathematics. |
| **Course**  **Activities and Assessment** | From time to time I shall give you home assignments to inculcate critical thinking ability. There will be one Mid Term examination and four quizzes. |
| **Make-up Policy** | I shall not conduct any make-up examination except for those who provide public sector hospital certificate. |
| **Attendance**  **Policy** | All students are advised to attend all of my classes punctually. Any student who participate in class activities will be eligible for 5 Marks. If your attendance is below 75% of scheduled classes then you will not be allowed to sit in final examination. |
| **Books:** | |  |  |  |  | | --- | --- | --- | --- | | اسم الكتاب | اسم المؤلف | اسم الناشر | سنة النشر | | Linear Algebra | H. Anton and C. Rorres | John Wiley & Sons | 10th ED 2010 | | Calculus | Swokowski, Olinick and Pence | PWS publishing Co | 6th Ed 1994 | |
| **Grading Policy** | |  |  |  |  | | --- | --- | --- | --- | | No. | Assessment task | Date due  (Academic Week) | Proportion of Final Assessment | | 1 | Assignments | After every main topics | 10% | | 2 | Quizzes (4) | 3rd, 5th, 9th & 11th | 20% | | 3 | Class participation | -- | 5% | | 4 | Mid-term Examination | 7th | 25% | | 5 | Final Examination | As scheduled by the university | 40 % | |

|  |  |  |
| --- | --- | --- |
|  | | |
| Topics | No of  Weeks | Contact hours |
| **System of linear equations and matrices** | **3** | **9** |
| **Determinants** | **2** | **6** |
| **Vectors and surfaces** | **2** | **6** |
| **Curves and motion in space** | **2** | **6** |
| **Partial differentiation** | **2** | **6** |
| **Gradient** | **1** | **3** |
| **Direction derivatives** | **1** | **3** |
| **Application of Gradients** | **1** | **3** |
| Total number of weeks and contact hours per semester | **14** | **42** |