المنصورة
كلية : العلـــوم
قسـم : الرياضيات

| ١ـ بيانات المقرر | | |
|---|---|---|
| كود المادة : Math 215 | اسم المقرر : Linear Algebra 1 | المستوى: الثانى |
| التخصص: إحصاء وعلوم الحاسب | عدد الوحدات الدراسية: ٣ ساعة معتمدة نظرى ٢: تمارين: ٢ عملى: ٠ | |

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| ٢ـ هدف المقرر : | **For students undertaking this course, the aims are to:**<br>1- Provide students with basic concepts of linear algebra; namely, Algebra of matrices, vector spaces, linear transformations and operators and their properties. |
| ٣ـ المستهدف من تدريس المقرر | |
| أ- المعلومات و المفاهيم : | **a- Knowledge and Understanding**<br>**On completing the course students will be able to:**<br>a1- understand basic definitions and theories of the course<br>a2- Learn the fundamental operations on matrices and calculate the determinant and the inverse of a matrix<br>a3–be aware of the systems of homogeneous and nonhomogeneous linear equations.<br>a4 - use standard methods to find bases of the vector spaces; |
| ب- المهارات الذهنية: | **b- Intellectual Skills:**<br>**On completing the course students will be able to:**<br>b1 - find real eigenvalues and eigenvectors of linear operators in 3-dimensional space;<br>b2- convert symmetric matrices corresponding to linear operators in 3-dimensional space with real eigenvalues to a diagonal form<br>b3- compute matrices for linear operators with regard to given bases<br>b4- develop logical thinking |
| ج- المهارات المهنية الخاصة بالمقرر : | **c-Professional and Practical Skills**<br>**On completing the course students will be able to:**<br>c1- Handing-in of homework and attendance at tutorials described in the second Year Handbook.<br>c2 - Solve some simple problems in n- dimensional space<br>c3 - Learn how can one transfer the applied mathematics problems to matrices form and solve it. |
| د- المهارات العامة : | **d-General and Transferable Skills :**<br>**On completing the course students will be able to:**<br>d1- Use Internet and Library to get information<br>d2- Work in a group<br>d3- solve simple algebraic |
| ٤ـ محتوى المقرر : | • What is a field and examples of the well-known field<br>• Matrices defined over a field, operations on matrices, Echelon form<br>• Algebra of square matrices, inverted matrix, and system of linear equations.<br>• What is a vector space, subspaces, intersection and addition of subspaces.<br>• Linear combination, dependently and independently set of vectors, Basis and Dimension of a vector space.<br>• Linear transformations and its properties and linear operators and its properties.<br>• Transformations from a basis to another.<br>• Eigen values and eigen vectors. |

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| • Similar matrices and diagonalization for square matrices.<br>• Applications | |
| 1- lectures<br>2- tutorials<br>**3-** use information technology | **٥- أســـاليـــب التعليـــم و التعلـم:** |
| The same as normal students, only skeletal disabilities are allowed in the faculty of science. | **٦- أساليب التعليم و التعلم للطـلاب ذوى القـدرات المحـدودة** |
| **٧- تقويـــــم الطـــلاب :** | |
| 1- Oral exam to assess a1-a4,b1-b4,d1-d3<br>2- Final exam to assess a1-a4,b1-b4,c1-c3<br>3- Mid-Term Exam to assess a1-a4,b1-b4,c1-c3 | **أ- الأساليب المستخدمة** |
| 1- Oral week 16<br>2- Final exam week 16<br>3- Mid-Term Exam week 7 | **ب- التوقيت** |
| - Mid-Term Examination 10 %<br>- Final-Term Examination 80%<br>- Oral Examination 10%<br>Total 100% | **ج- توزيع الدرجات** |
| **٨- قائمة الكتب الدراسية و المراجع :** | |
| - Department notes in this course | **أ- المذكرات** |
| - H. Anton, Elementary Linear Algebra, Wiley 1994 | **ب- الكتب ملزمة** |
| 1- J.B. Fraleigh & R.A. Beauregard, Linear Algebra, Addison-Wesley 1995<br>2- R.B.J.T. Allenby, Linear Algebra, Butterworth Heinemann, 1997 | **ج- كتب مقترحة** |
| http://joshua.smcvt.edu/linearalgebra/<br>http://www.math.unl.edu/~tshores1/linalgtext.html | **د- دوريـات علميـة أو نشرات** |

**(أ) مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسى**

| المحتويات للمقرر | اسبوع الدراسة | المعارف الرئيسية | مهارات ذهنية | مهارات مهنية | مهارات عامة |
|---|---|---|---|---|---|
| What is a field and examples of the well-known field | 1 | a1, a4 | | c1 | d1, d2 |
| Matrices defined over a field, operations on matrices, Echelon form | 2 | a1, a2 | | c1 | d1- d3 |
| Algebra of square matrices, inverted matrix, and system of linear equations. | 3 | a1,a2, a3 | b2 | c1-c3 | d1- d3 |
| What is a vector space, subspaces, intersection and addition of subspaces. | 4 | a3, a4 | b2, b3 | c1 | d1, d2, |
| Linear combination, dependently and independently set of vectors, Basis and Dimension of a vector space. | 5 | a1-a4 | b2, b3 | c1, c2 | d1, d2, |
| Linear transformations and its properties and linear operators and its proprties. | 6 | a1, a2 | b2, b3 | c1, c2 | d1, d2 |
| Transformation from basis to another basis | 7-8 | a1-a4 | b1-b4 | c1-c3 | d2, d3 |
| Eigenvalues and eigenvectors. | 10-11 | a3, a4 | b3 | c2, c3 | d2, d3 |
| Similar matrices and diagonalization for square matrices. | 12-13 | a3, a4 | b1, b2, | c1-c3 | d1- d3 |
| Applications | 14 | a3, a4 | b1, b3 | c1-c3 | d1, d3 |

**أستاذ المادة : د. صالح المهدى**

**رئيس مجلس القسم العلمي :ا.د. مجدى إلياس فارس**