

مختصر توصيف المقرر

(Course Information)

معلومات المقرر *

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| | الفيزياء الحاسوبية | اسم المقرر: |
| | فيز 3082 | رقم المقرر: |
| | فيز 3072 | اسم ورقم المتطلب السابق: |
| | -- | اسم ورقم المتطلب المرافق: |
| | السادس | مستوى المقرر: |
| | (0+0+3) 3 | الساعات المعتمدة: |
| Module Title: | Computational Physics | |
| Module ID: | PHYS 3082 | |
| Prerequisite (Co-requisite) : | PHYS 3072 | |
| Co-requisite : | -- | |
| Course Level: | Sixth | |
| Credit Hours: | 3 (3+0+0) | |



Module Description

وصف المقرر :

Introduction: Computation and Science, The emergence of Modern Computers, Computer Algorithms and Languages: Applications: Newton and Kepler Laws. Numerical linear Algebra: Systems of linear equations, Eigen values and Eigen vectors. Interpolation, Extrapolation and Data Fitting: Polynomial Interpolation, Data fitting, Least squares fitting. Ordinary differential equations: Initial-value problems, The Euler and Picard methods, The Runge-Kutta method, Chaotic dynamics of the driven pendulum, Boundary -value and eigenvalue problem, The one-dimensional Schrödinger equation.

Module Aims

أهداف المقرر :

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| 1 | This course will make the student be able to deal with the physical problems | |
| 2 | Using the appropriate logarithms for solving the problems using the suitable computer programs | |

Learning Outcomes:

مخرجات التعليم:

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| 1 | Knowledge: <ul style="list-style-type: none"> The student will be to study the principles of Computation and Science | |
| 2 | Interpersonal skills and responsibility: <ul style="list-style-type: none"> The ability to form groups and distribute the duties. The skills of presentation in front of the others. The skill of constructive criticism, and discussion. The ability to express opinions clearly and accept others opinion | |

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| 3 | Cognitive Skills: <ul style="list-style-type: none"> • Solve different exercises in the course book. • know the basic elements of the Computer Algorithms and Languages • To develop the ability of the student skills by doing some Applications: Newton and Kepler Laws. Numerical linear Algebra throughout the semester | |
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Course Contents:
محتوى المقرر:

| ساعات التدريس (Hours) | عدد الأسابيع (Weeks) | قائمة الموضوعات (Subjects) |
|--------------------------|-------------------------|---|
| 6 | 1 | Introduction to Computation and Science, |
| 4 | 3 | The emergence of Modern Computers, Computer Algorithms and Languages |
| 4 | 2 | Applications: Newton and Kepler Laws. Numerical linear Algebra |
| 6 | 3 | Systems of linear equations, Eigen values and Eigen vectors. Interpolation, Extrapolation and Data Fitting: Polynomial Interpolation, Data fitting, Least squares fitting. |
| 4 | 2 | Ordinary differential equations: Initial-value problems. |
| 6 | 3 | The Euler and Picard methods, The Runge-Kutta method, Chaotic dynamics of the driven pendulum, Boundary -value and eigenvalue problem, The one-dimensional Schrodinger equation |

Textbook and References:
المقرر والمراجع المساندة:

| سنة النشر Publishing Year | اسم الناشر Publisher | اسم المؤلف (رئيسي) Author's Name | اسم الكتاب المقرر Textbook title |
|------------------------------|--|-------------------------------------|-------------------------------------|
| (2006) ISBN: 0131469908 | Nicholas J. Giordano, Hisao Nakanishi | Addison, Wesely, | Computational Physics |
| سنة النشر Publishing Year | اسم الناشر Publisher | اسم المؤلف (رئيسي) Author's Name | اسم المرجع Reference |
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