

المفردات	الوحدات	المادة	ت
<p>1. Light propagation.</p> <p>(1-1)- Elementary optical phenomena and the nature of light.</p> <p>(1-2)- The electrical constants and speed of light.</p> <p>(1-3)- The plane harmonic waves, phase velocity, sources of electromagnetic waves.</p> <p>(1-4)- Alternative way of representing harmonic waves.</p> <p>(1-5)- group velocity.</p> <p>(1-6)- Doppler effect in light and its applications.</p> <p>2. The vectorial nature of light.</p> <p>(2-1)- Energy flow, the Poynting vector.</p> <p>(2-2)- Polarization and its types.</p> <p>(2-3)- Matrix representation of polarization (the Jones calculus).</p> <p>(2-4)- Jones matrices for linear optical elements such as, polarizers and retardation plates.</p> <p>(2-5)- Reflection and refraction at a plane boundary.</p>	٢	البصريات الفيزيائية (1) (ف) ١	1

<ol style="list-style-type: none"> 1. Principles of the laser. 2. Pumping schemes. 3. Properties of lasers. 4. Interaction rays with matter. 5. Einstein coefficients and find their relationships. 6. Optical stimulation of atoms. 7. Population inversion. 8. Form and wide of spectral lines. 9. Saturation. 10. Amplifier real laser. 11. Terminology spectroscopic and units. 12. Types of lasers. 13. The efficiency. 14. Spherical optical cavities (resonator). 	٢	فيزياء الليزر	2
<ol style="list-style-type: none"> 1. Fundamental concepts vectors. 2. Newtonian mechanics rectilinear motion of a particle. 3. General motion of a particle in three dimensions. 4. Noninertial reference systems 	٣	الميكانيك التحليلي ا	3
<ol style="list-style-type: none"> 1- Introduction 2- The crystalline state 3- Unit cells 4- Symmetry and element of symmetry 5- Miller indices and crystal direction 6- Crystal structure 7- Types of bonds 8- X- ray Neutron and Electron diffraction 9- Reciprocal lattice and Brillion zone 10- Crystalline defect 	٢	علم البلورات	4

1. Matrices and systems of linear equations.
 - 1-1 Some special matrices.
 - 1-2 Determinants.
 - 1-3 The inverse and related matrices.
 - 1-4 Matrices algebra.
 - 1-5 Diagonalization of matrices.
 - 1-6 Transformations and mapping
 - 1-7 Systems of linear algebraic equations.
 - 1-8 Eigenvalues and eigenvectors.
2. Gamma and beta functions.
 - 2-1 Gamma function.
 - 2-2 Beta function.
 - 2-3 Relation between beta and gamma functions.
3. Fourier analysis.
 - 3-1 Fourier series.
 - 3-2 Complex fourier series.
 - 3-3 Advantage fourier series.

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الرياضيات والنمذجة (ف ١)

- 1-2 Types of discharge.
- 2. Fundamental processes.
 - 2-1 The kinetic theory of a simple gas.
 - 2-2 Collisions.
 - 2-2-1 Elastic-collision.
 - 2-2-2 Inelastic-collision.
 - 2-2-3 Attachment and recombination.
 - 2-2-4 Mobility.
 - 2-2-5 Diffusion.
- 3. Electrode effects.
 - 3-1 Thermoionic emission.
 - 3-2 Photoelectric emission.
 - 3-3 Emission by electron impact.
 - 3-4 Emission by positive-ion impact.
 - 3-5 Emission by neutral atom impact.
 - 3-6 Field emission.
- 4. Breakdown.
 - 4-1 The townsend discharge.
 - 4-2 Effect of space charge.
 - 4-3 Effect of secondary emission.
 - 4-4 The townsend criterion.
 - 4-5 paschen's law.
- 5. Plasma measurements.
 - 5-1 Probe measurement.
 - 5-2 measurements from emission spectra.

Experiments involve on optics and electrical measurements

٢	فيزياء البلازما	6
٣	الفيزياء العملية (أ) (ف ١)	7

<p>1- The brewster angle 2- The evanescent wave in total reflection 3- Fresnel's rhomb 4- Coherence and interference 5- The principle of linear superposition 6- Young's experiment</p>	<p>٢</p>	<p>البصريات الفيزيائية (II) (ف) ٢</p>	<p>8</p>
<p>1- Laser in length :measurement of length; interferometry, surface topology& optical component testing. 2- Laser plasma interaction: Basic concepts and tow-fluid description of plasmas, electromagnetic wave propagation in plasmas 3- Holography: the wavefront reconstruction process: inline hologram, the off axis hologram 4- Industrial: cutting, welding, drilling, ranging, barcode scanners, CD players 5- Medical: examples: laser scalpels, photo-dynamic therapy, cataract correction. 6- Scientific: Absorption spectroscopy; Emission Techniques (Laser Induced Fluorescence) Scattering Techniques , Pump and Probe Techniques; diagnostics of excited states Signal to Noise Ratio Considerations 7- Optical communication Laser in the army : Measure distances, Missile guidance , Destroy targets the plan .</p>	<p>٢</p>	<p>تطبيقات الليزر</p>	<p>9</p>

<p>1- General forces and celestial Mechanics 2- Dynamics of system of many particles 3- Mechanics of rigid bodies motion 4- Motion of a rigid bodies in three dimensions 5- Lagran gian Mechanics 6- Dynamics of oscillating systems</p>	٣	الميكانيك التحليلي (II) (٢ف)	10
<p>1- Introduction 2- Force and Energy between zons, atoms and molecules 3- Crystal growth 4- Phase equilibrium and phase equilibrium diagram 5- Mechanical properties of material 6- Some types of materials (6-1)- Polymer material (6-2)- Ceramic material (6-3)- Composite material 7- Corrosion of metals</p>	٢	علم المواد	11

1- Complex Analysis

(1-1)- Complex number (review)

(1-2)- Complex Function

(1-3)- Limits , Continuity and derivatives

(1-4)- Cauchy – Riemann equations

(1-5)- Series Complex numbers

(1-6)- Power series representation(Taylor's and Laurent's expansion)

(1-7)- Singularities

(1-8)- The residue theorem

(1-9)- Some applications of residue theorem

2- Ordinary Differential Equations

(2-1)- Laplace transform (Solution of initial value problem , Shifting theorem)

(2-2)- Power series using recurrence relation

(2-3)- Power series solution of initial boundary problem Numerical Analysis

3- Numerical methods using Matlab

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(1-1)- Short Historical overview			
(1-2)- Molecular Formation			
(1-3)- The Hz molecules			
(1-4)- Molecular orbital's			
2- Electronic structure of molecules			
(2-1)- Introduction			
(2-2)-poleutional Energy par baler for Hydrogen molecules			
(2-3)- Bond in Diatomic molecules			
(2-4)- Born- oppenheimer Approximation			
(2-5)- Electronic Energy Levels			
3- Rotational Energy			
(3-1)- Rotated			
(3-1-1)- Linear molecules			
(3-1-2)- Symmetric Top molecules	٢		
(3-1-3)- Spherical Top molecules			
(3-1-4)- As symmetric Top molecules			
(3-2)- Molecular spectra			
(3-3)-The Rotational Energy of Linear molecular(Rigid Rotater)			
(3-4)- Population of Rotational Energy Levels			
(3-5)- Non Rigid Rotater			
4- Vibrational Energy			
(4-1)- Harmonic-vibration of Diatomic molecules			
(4-2)- Population of vibrational Energy Levels			
(4-3)- Vibrational Energy Levels polyatomic molecules			
5- Vibrating – Rotator Energies			
(5-1)- The Diatomic vibrating – Rotator spectrum		الفيزياء الجزيئية	13
Experiments involve on optics			
Electrical measurements	٣	الفيزياء العملية (II)(ف٢)	14