



## 6. Course Specification of Engineering Physics

I. Course Identification and General Information:						
1.	Course Title:	Engineering Physics				
2.	Course Code & Number:	FR002				
3.	Credit hours:	C.H				
		Th.	Tu.	Pr.	Tr.	Total
		2	2	2	-	4
4.	Study level/ semester at which this course is offered:	Level 1 / Semester 1				
5.	Pre –requisite (if any):	Mathematics 1				
6.	Co –requisite (if any):	None				
7.	Program (s) in which the course is offered:	Electrical Engineering				
8.	Language of teaching the course:	English and Arabic				
9.	Location of teaching the course:	Faculty of Engineering				
10	Prepared By:	Prof. Abdu A. Alkelly , Assoc. Prof. Dr. Riyadh A. Muharam				
11	Date of Approval					

II. Course Description:
<p>This course is an introduction to the fundamental principles that describe the different concepts in electricity and magnetism which form core components of physics that one need in understanding some other components of physics and electrical engineering and this course <b>shows</b> the calculus requisite in various applications and analysis. It deals with units measurements and vectors, Newton's Laws of Motion, Fluid Mechanics, Properties and Performance of Engineering Materials, Heat Transfer, Simple Harmonic Motion, Wave Motion and Waves on a String, Sound Waves, Light Waves, Geometrical Optics, Electric field . It <b>helps students to</b> develop their skills through problem solving and dimensional</p>

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analysis. This course will include number of experiments in basic topics in Physics which are designed to help students to develop the basic investigation skills such as data acquisition, graph plotting, data analysis, error analysis, results discussion, and report writing.

III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1	Acquire knowledge and understanding of fundamental laws and principles of mechanics and their applications in various practical contexts, carrying through the scientific methodology relevant to Mechanical Engineering	A1
a2	<b>Introduce</b> the notions of Fluid Mechanics, Heat Transfer, interaction, light, Wave Motion and Waves on a String .	A4
b1	<b>Understand</b> the fundamentals of acoustics, and determination of Simple Harmonic Motion, Center of Gravity.	B1
b2	<b>Comprehend</b> the fundamentals of Properties and Performance of Engineering Materials Sound and Light Waves Geometrical Optics and Electric field.	B1
c1	Apply the fundamental laws of mechanics practically through scientific experiments	C1
c2	Design some simple electrical or magnetic circuits and identify the symbols and figures of some electrical devices	C2
d1	Cope with changes and development in their profession using variety of sources such as Journal, workshops, Internet, etc.	D4
d2	Use appropriate instruments such as calculators, spread sheets, databases and graphing programs to effectively convey the information, and work in groups to collect data or to produce reports and presentations	D5

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<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1-</b> Acquire knowledge and understanding of fundamental laws and principles of mechanics and their applications in various practical contexts, carrying through the scientific methodology relevant to Mechanical Engineering	Lecture and discussion Individual and group work	Quizzes, Assignments, Exams
<b>a2-</b> <b>Introduce</b> the notions of Fluid Mechanics, Heat Transfer, interaction, light, Wave Motion and Waves on a String .	Lecture and discussion Individual and group work	Quizzes, Assignments, Exams

<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1-</b> <b>Understand</b> the fundamentals of acoustics, and determination of Simple Harmonic Motion, Center of Gravity.	Lecture and discussion Individual and group work	Quizzes, Assignments, Exams
<b>b2-</b> <b>Learn</b> the fundamentals of Properties and Performance of Engineering Materials Sound and Light Waves Geometrical Optics and Electric field.	Lecture and discussion Individual and group work	Quizzes, Assignments, Exams

<b>(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies

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<b>c1-</b> Apply the fundamental laws of mechanics practically through scientific experiments	Experimental work,	Discussion, Practical Tests
<b>c2-</b> Design some simple electrical or magnetic circuits and identify the symbols and figures of some electrical devices	Experimental work,	Discussion, Practical Tests

<b>(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1-</b> Cope with changes and development in their profession using variety of sources such as Journal, workshops, Internet, etc.	Individual and group works Computer Laboratory	Assignments, Reports
<b>d2-</b> Use appropriate instruments such as calculators, spread sheets, databases and graphing programs to effectively convey the information, and work in groups to collect data or to produce reports and presentations	Individual and group works Computer Laboratory	Assignments, Reports

<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours
1.	Units and Measurements	a1,a2,b1,c1, c2, b2	<ul style="list-style-type: none"> <li>▪ Introduction.</li> <li>▪ Units Conversions.</li> <li>▪ Derived Units.</li> <li>▪ Significant Figures.</li> <li>▪ Dimensional Analysis.</li> </ul>	1	2

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2.	Vectors	a1,a2,b1,b2	<ul style="list-style-type: none"> <li>▪ Scalar and Vector Quantities.</li> <li>▪ Vector Addition and Subtraction.</li> <li>▪ The Position Vector.</li> <li>▪ Compound of a Vector.</li> <li>▪ Vector Multiplication.</li> </ul>	1	2
3.	Newton's Laws of Motion	a1,b1,b2,c1	<ul style="list-style-type: none"> <li>▪ The Gravitational Force and Weight.</li> <li>▪ Newton's First Law of Motion.</li> <li>▪ Newton's Second Law of Motion.</li> <li>▪ Newton's Third Law of Motion.</li> </ul>	2	4
4.	Fluid Mechanics	a1,a2,b1,b2d1	<ul style="list-style-type: none"> <li>▪ Fluids.</li> <li>▪ Pressure in a Fluid.</li> <li>▪ Pascal's Law.</li> <li>▪ Atmosphere Pressure and Barometer.</li> <li>▪ Archimedes' Principle.</li> <li>▪ Laminar and Turbulent Flow.</li> <li>▪ Equation of Continuity.</li> <li>▪ Bernoulli's Equation.</li> </ul>	1	2
5.	Properties and Performance of Engineering Materials	a1,a2,b1,b2,c1,c2	<ul style="list-style-type: none"> <li>▪ Elasticity.</li> <li>▪ Stress and Strain.</li> <li>▪ Elastic Moduli.</li> <li>▪ Poisson's Ratio.</li> <li>▪ Elastic Limit.</li> </ul>	1	2
6.	Heat Transfer	a1,a2,b1,b2,c1,d1	<ul style="list-style-type: none"> <li>▪ Heat and Temperature.</li> <li>▪ Zeroth and first Laws of Thermodynamics</li> </ul>	1	2

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			<ul style="list-style-type: none"> <li>▪ Conduction, Convection and Radiation.</li> <li>▪ Newton's Law of Cooling.</li> <li>▪ Detection and Measurement of Radiation.</li> </ul>		
7.	Simple Harmonic Motion	$a_1, a_2, b_1, b_2, d_1, c_1$	<ul style="list-style-type: none"> <li>▪ Simple Harmonic Motion.</li> <li>▪ Equation of Motion of a Simple Harmonic Motion.</li> <li>▪ Composition of Two Simple Harmonic Motions.</li> <li>▪ Damped Harmonic Motion</li> <li>▪ Forced Oscillation and Response.</li> </ul>	1	2
8.	Wave Motion and Waves on a String	$a_1, a_2, b_1, b_2, c_1, d_2$	<ul style="list-style-type: none"> <li>▪ Wave Motion.</li> <li>▪ Sine Waves travelling on a String.</li> <li>▪ Velocity of the Wave and Power Transmitted by the Sine Wave.</li> <li>▪ Interference and Superposition</li> <li>▪ Reflection and Transmission of a Wave.</li> <li>▪ Standing Waves.</li> </ul>	1	2
9.	Sound Waves	$a_1, a_2, b_1, b_2, c_1, d_1$	<ul style="list-style-type: none"> <li>▪ The Nature and Propagation of Sound Waves.</li> <li>▪ Displacement Waves and Pressure Waves.</li> <li>▪ Speed of a Sound Wave in a Material Medium.</li> <li>▪ Effect of Pressure, Temperature and Humidity on the Speed of Sound in Air.</li> </ul>	1	2

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			<ul style="list-style-type: none"> <li>▪ Intensity of Sound Waves.</li> <li>▪ Appearance of Sound to Human Ear.</li> <li>▪ Interference of Sound Waves.</li> <li>▪ Diffraction.</li> <li>▪ Doppler Effect.</li> <li>▪ Acoustics of Buildings.</li> </ul>		
10.	Light Waves	a1,a2,b1,b2, ,c1, c2,d1	<ul style="list-style-type: none"> <li>▪ Wave Motion.</li> <li>▪ The Nature of a Light.</li> <li>▪ Huygens' Principle.</li> <li>▪ Young's Double Slit Experiment.</li> <li>▪ Optical Path.</li> <li>▪ Interference, Diffraction and Polarization.</li> </ul>	1	2
11.	Geometrical Optics	a1,a2,b1,b2, ,c1,d1,d2	<ul style="list-style-type: none"> <li>▪ Reflection at Smooth Surfaces.</li> <li>▪ Spherical Mirrors.</li> <li>▪ Extended Objects and Magnification.</li> <li>▪ Refraction at Plane Surfaces.</li> <li>▪ Critical Angle.</li> <li>▪ Optical Fibre.</li> <li>▪ Prism.</li> <li>▪ Refraction at Spherical Surfaces.</li> <li>▪ Lenses.</li> <li>▪ Defects of Images.</li> </ul>	1	2
12.	Electric field	a1,a2,b1, c2,b2,d2	<ul style="list-style-type: none"> <li>▪ Electromotive Force.</li> <li>▪ Charges, Coulomb's Law.</li> <li>▪ Ohm's ,Kirchoff's Laws.</li> <li>▪ Calculus of potential and Electric fields</li> </ul>	2	4

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<b>Number of Weeks /and Units Per Semester</b>	<b>14</b>	<b>28</b>
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<b>B - Practical Aspect:</b>				
<b>Order</b>	<b>Tasks/ Experiments</b>	<b>Number of Weeks</b>	<b>Contact hours</b>	<b>CILO,s</b>
1.	Determining an Equation for a Function from a Graph	1	3	a1, b1, b2,c1, c2,d1, d2
2.	Data Analysis with Excel and Estimation of Errors	1	3	a1, b1, b2,c1, c2,d1, d2
3.	Forces and Equilibrium (Springs and Equilibrium, Forces and Liquids)	1	3	a1, b1, b2,c1, c2,d1, d2
4.	Force and Conservation of Energy (Constant Velocity Motion, Falling, Normal Force & Frictional Force, and Collisions)	2	3	a1, b1, b2,c1, c2,d1, d2
5.	Midterm Exam	1	3	a1, b1, b2,c1, c2,d1, d2
6.	Air Track Apparatus (Newton's First, Second, and Third Laws and the Gravitational Acceleration)	2	3	a1, b1, b2,c1, c2,d1, d2
7.	Potential Energy (Elastic & Gravitational Energy and Pendulum)	1	3	a1, b1, b2,c1, c2,d1, d2
8.	Oscillations (Measuring Spring Constants, Oscillation Frequency of an Extended System, Simple Pendulum)	1	3	a1, b1, b2,c1, c2,d1, d2
9.	Predicting Non-repetitive Motion (Motion in a Fluid, Circular Motion, and Two-Dimensional Motion)	1	3	a1, b1, b2,c1, c2,d1, d2
<b>Number of Weeks /and Units Per Semester</b>		<b>11</b>	<b>33</b>	

<b>C - Tutorial</b>
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Order	Tasks/ Tutorial	Number of Weeks	Contact hours	Learning Outcomes
1.	Units, measurements and vectors	2	4	a1, a2, b1,b2, c1,c2,d1,d2
2.	Newton's Laws of Motion.	1	2	a1, a2, b1,b2, c1,c2,d1,d2
3.	Fluid Mechanics	2	4	a1, a2, b1,b2, c1,c2,d1,d2
4.	Properties and Performance of Engineering Materials	1	2	a1, a2, b1,b2, c1,c2,d1,d2
5.	Heat Transfer.	1	2	a1, a2, b1,b2, c1,c2,d1,d2
6.	Simple Harmonic Motion.	2	4	a1, a2, b1,b2, c1,c2,d1,d2
7.	Wave Motion and Waves on a String.	1	2	a1, a2, b1,b2, c1,c2,d1,d2
8.	Sound Waves.	1	2	a1, a2, b1,b2, c1,c2,d1,d2
9.	Light Waves	1	2	a1, a2, b1,b2, c1,c2,d1,d2
10.	Geometrical Optics	1	2	a1, a2, b1,b2, c1,c2,d1,d2
11.	Electric field	1	2	a1, a2, b1,b2, c1,c2,d1,d2
<b>Number of Weeks /and Units Per Semester</b>		<b>14</b>	<b>28</b>	

<b>V. Teaching strategies of the course:</b>	
<ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Examples</li> <li>▪ Discussion</li> <li>▪ Laboratory</li> <li>▪ Individual and group Projects</li> </ul>	

<b>VI. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	3 <sup>th</sup>	1.5
2.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	6 <sup>th</sup>	1.5
3.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	9 <sup>th</sup>	1.5

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4.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	12 <sup>th</sup>	1.5
	<b>Total</b>			<b>6</b>

<b>VII. Schedule of Assessment Tasks for Students During the Semester:</b>					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	<b>Theoretical</b>		70	100%	a1, b1, b2,c1, c2,d1, d2
1.	Assignments	3,6,9,12	6	8.6%	a1, b1, b2,c1, c2,d1, d2
2.	Attendance & Participation	1-14	4	5.7%	
3.	Essay/Report		3	4.3%	
4.	Quizzes	Every 2 weeks	5	7.1%	
5.	Midterm exam	8 <sup>th</sup> week	10	14.3%	a1, b1, b2,c1, c2,d1, d2
6.	Final Exam		42	60%	
	<b>Practical</b>		30	100%	a1, b1, b2,c1, c2,d1, d2
1.	Participation (Attendance & Group Discussion)	weekly	1.5	5%	a1, b1, b2,c1, c2,d1, d2
2.	Essay/Report	weekly	1.5	5%	a1, b1, b2,c1, c2,d1, d2
3.	Exercises & Homework	weekly	1.5	5%	a1, b1, b2,c1, c2,d1, d2
4.	Midterm Exam	6 <sup>th</sup> Lab	6	20%	a1, b1, b2,c1, c2,d1, d2
5.	Quiz	5 <sup>th</sup> Lab	1.5	5%	a1, b1, b2,c1, c2,d1, d2
6.	Final Exam (practical)		18	60%	a1, b1, b2,c1, c2,d1, d2
	<b>Total</b>		<b>100</b>	<b>200%</b>	

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<b>VIII. Learning Resources:</b>	
<i>Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).</i>	
1- Required Textbook(s) ( maximum two ).	
	<ol style="list-style-type: none"> <li>1. Serway and Jewett, Physics for Scientists and Engineers, 9th edition, Cengage Learning, 2014</li> <li>2. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of physics, , 9th ed., John Wiley, 2011</li> </ol>
2- Essential References.	
	<ol style="list-style-type: none"> <li>1. Jearl Walker, Fundamentals of Physics-8th edition, John Wiley &amp; Sons, 2007</li> </ol>
3- Electronic Materials and Web Sites etc.	
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IX. Course Policies:	
1.	<p><b>Class Attendance:</b>                      A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring <b>an approved</b> statement from university Clinic</p>
2.	<p><b>Tardy:</b>                      For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.</p>
3.	<p><b>Exam Attendance/Punctuality:</b>                      A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam-</p>
4.	<p><b>Assignments &amp; Projects:</b>                      The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-</p>
5.	<p><b>Cheating:</b>                      For cheating in exam, a student will be considered as <b>failure</b>. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty-</p>
6.	<p><b>Plagiarism:</b>                      Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee <b>proved</b> a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.</p>
7.	<p><b>Other policies:</b>                      - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room                      - Mobile phones are not allowed in class during the examination.                      Lecture notes and assignments my given directly to students using soft or hard copy</p>

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<p><b>Reviewed By</b></p>	<p><b><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u></b>  <b><u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u></b>  <b><u>Name of Reviewer from the Department: Assoc. Prof. Dr. Riyad A. Muharram.</u></b></p>
	<p><b><u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u></b>  <b><u>Assoc. Prof. Dr. Ahmed Mujahed</u></b>  <b><u>Asst. Prof. Dr. Munasar Alsubri</u></b></p>

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## 6. Course Plan of Engineering Physics

<b>I. Information about Faculty Member Responsible for the Course:</b>								
<b>Name</b>	Prof. Abdu A. Alkelly , Dr. Riyadh A. Muharam		<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>	Faculty Of Engineering - Sana'a		SAT	SUN	MON	TUE	WED	THU
<b>E-mail</b>								

<b>II. Course Identification and General Information:</b>						
1.	Course Title:	Engineering Physics				
2.	Course Number & Code:	FR002				
3.	Credit hours:	C.H				TOTAL
		Th.	Tu.	Pr.	Tr.	
		2	2	2	-	
4.	Study level/year at which this course is offered:	Level 1 / Semester 1				
5.	Pre –requisite (if any):	Mathematics 1				
6.	Co –requisite (if any):	None.				
7.	Program (s) in which the course is offered	Electrical Engineering Department				
8.	Language of teaching the course:	English/Arabic				
9.	System of Study:	Regular				
10.	Mode of delivery:	Lecture				
11.	Location of teaching the course:	Faculty of Engineering				

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### III. Course Description:

This course is an introduction to the fundamental principles that describe the different concepts in electricity and magnetism which form core components of physics that one need in understanding some other components of physics and electrical engineering and this course **shows** the calculus requisite in various applications and analysis. It deals with units measurements and vectors, Newton's Laws of Motion, Fluid Mechanics, Properties and Performance of Engineering Materials, Heat Transfer, Simple Harmonic Motion, Wave Motion and Waves on a String, Sound Waves, Light Waves, Geometrical Optics, Electric field . It **helps students** to develop their skills through problem solving and dimensional analysis. This course will include number of experiments in basic topics in Physics which are designed to help students to develop the basic investigation skills such as data acquisition, graph plotting, data analysis, error analysis, results discussion, and report writing.

### IV. Intended learning outcomes (ILOs) of the course:

Brief summary of the knowledge or skill the course is intended to develop:

1. Acquire knowledge and understanding of fundamental laws and principles of mechanics and their applications in various practical contexts, carrying through the scientific methodology relevant to Mechanical Engineering
2. **Introduce** the notions of Fluid Mechanics, Heat Transfer, interaction, light, Wave Motion and Waves on a String .
3. **Understand** the fundamentals of acoustics, and determination of Simple Harmonic Motion, Center of Gravity.
4. **Comprehend** the fundamentals of Properties and Performance of Engineering Materials Sound and Light Waves Geometrical Optics and Electric field.
5. Apply the fundamental laws of mechanics practically through scientific experiments
6. Design some simple electrical or magnetic circuits and identify the symbols and figures of some electrical devices
7. Cope with changes and development in their profession using variety of sources such as Journal, workshops, Internet, etc.

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8. Use appropriate instruments such as calculators, spread sheets, databases and graphing programs to effectively convey the information, and work in groups to collect data or to produce reports and presentations

V. Course Content:				
A – Theoretical Aspect:				
Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours
1.	Units and Measurements	<ul style="list-style-type: none"> <li>▪ Introduction.</li> <li>▪ Units Conversions.</li> <li>▪ Derived Units.</li> <li>▪ Signifiant Figures.</li> <li>▪ Dimensional Analysais.</li> </ul>	1 <sup>st</sup>	2
2.	Vectors	<ul style="list-style-type: none"> <li>▪ Scalar and Vector Quantities.</li> <li>▪ Vector Addition and Subtraction.</li> <li>▪ The Position Vector.</li> <li>▪ Compound of a Vector.</li> <li>▪ Vector Multiplication.</li> </ul>	2 <sup>nd</sup>	2
3.	Newton's Laws of Motion	<ul style="list-style-type: none"> <li>▪ The Gravitational Force and Weight.</li> <li>▪ Newton's First Law of Motion.</li> <li>▪ Newton's Second Law of Motion.</li> <li>▪ Newton's Third Law of Motion.</li> </ul>	3 <sup>rd</sup> ,4 <sup>th</sup>	4
4.	Fluid Mechanics	<ul style="list-style-type: none"> <li>▪ Fluids.</li> <li>▪ Pressure in a Fluid.</li> <li>▪ Pascal's Law.</li> <li>▪ Atmosphere Pressure and Barometer.</li> <li>▪ Archimedes' Principle.</li> <li>▪ Laminar and Turbulent Flow.</li> <li>▪ Equation of Continuity.</li> <li>▪ Bernoulli's Equation.</li> </ul>	5 <sup>th</sup>	2
5.	Properties and Performance	<ul style="list-style-type: none"> <li>▪ Elasticity.</li> <li>▪ Stress and Strain.</li> </ul>	6 <sup>th</sup>	2

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	of Engineering Materials	<ul style="list-style-type: none"> <li>▪ Elastic Moduli.</li> <li>▪ Poisson's Ratio.</li> <li>▪ Elastic Limit.</li> </ul>		
6.	Heat Transfer	<ul style="list-style-type: none"> <li>▪ Heat and Temperature.</li> <li>▪ Zeroth and first Laws of Thermodynamics</li> <li>▪ Conduction, Convection and Radiation.</li> <li>▪ Newton's Law of Cooling.</li> <li>▪ Detection and Measurement of Radiation.</li> </ul>	7 <sup>th</sup>	2
7.	Mid –Term Exam	<ul style="list-style-type: none"> <li>▪ All the Previous Chapters.</li> </ul>	8 <sup>th</sup>	2
8.	Simple Harmonic Motion	<ul style="list-style-type: none"> <li>▪ Simple Harmonic Motion.</li> <li>▪ Equation of Motion of a Simple Harmonic Motion.</li> <li>▪ Composition of Two Simple Harmonic Motions.</li> <li>▪ Damped Harmonic Motion</li> <li>▪ Forced Oscillation and Response.</li> </ul>	9 <sup>th</sup>	2
9.	Wave Motion and Waves on a String	<ul style="list-style-type: none"> <li>▪ Wave Motion.</li> <li>▪ Sine Waves travelling on a String.</li> <li>▪ Velocity of the Wave and Power Transmitted by the Sine Wave.</li> <li>▪ Interference and Superposition</li> <li>▪ Reflection and Transmission of a Wave.</li> <li>▪ Standing Waves.</li> </ul>	10 <sup>th</sup>	2
10.	Sound Waves	<ul style="list-style-type: none"> <li>▪ The Nature and Propagation of Sound Waves.</li> <li>▪ Displacement Waves and Pressure Waves.</li> <li>▪ Speed of a Sound Wave in a Material Medium.</li> <li>▪ Effect of Pressure, Temperature and Humidity on the Speed of Sound in Air.</li> <li>▪ Intensity of Sound Waves.</li> <li>▪ Appearance of Sound to Human Ear.</li> </ul>	11 <sup>th</sup>	2

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		<ul style="list-style-type: none"> <li>▪ Interference of Sound Waves.</li> <li>▪ Diffraction.</li> <li>▪ Doppler Effect.</li> <li>▪ Acoustics of Buildings.</li> </ul>		
11.	Light Waves	<ul style="list-style-type: none"> <li>▪ Wave Motion.</li> <li>▪ The Nature of a Light.</li> <li>▪ Huygens' Principle.</li> <li>▪ Young's Double Slit Experiment.</li> <li>▪ Optical Path.</li> <li>▪ Interference, Diffraction and Polarization.</li> </ul>	12 <sup>th</sup>	2
12.	Geometrical Optics	<ul style="list-style-type: none"> <li>▪ Reflection at Smooth Surfaces.</li> <li>▪ Spherical Mirrors.</li> <li>▪ Extended Objects and Magnification.</li> <li>▪ Refraction at Plane Surfaces.</li> <li>▪ Critical Angle.</li> <li>▪ Optical Fibre.</li> <li>▪ Prism.</li> <li>▪ Refraction at Spherical Surfaces.</li> <li>▪ Lenses.</li> <li>▪ Defects of Images.</li> </ul>	13 <sup>th</sup>	2
13.	Electric field	<ul style="list-style-type: none"> <li>▪ Electromotive Force.</li> <li>▪ Charges, Coulomb's Law.</li> <li>▪ Ohm's ,Kirchoff's Laws.</li> <li>▪ Calculus of potential and Electric fields</li> </ul>	14 <sup>th</sup> ,15 <sup>th</sup>	4
14.	Final Exam.	<ul style="list-style-type: none"> <li>▪ All Chapters.</li> </ul>	16 <sup>th</sup>	2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>

<b>B - Practical Aspect:</b>			
<b>Order</b>	<b>Tasks/ Experiments</b>	<b>Number of Weeks</b>	<b>Contact hours</b>
1.	Determining an Equation for a Function from a Graph	1 <sup>st</sup>	3
2.	Data Analysis with Excel and Estimation of Errors	2 <sup>nd</sup>	3

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3.	Forces and Equilibrium (Springs and Equilibrium, Forces and Liquids)	3 <sup>rd</sup>	3
4.	Force and Conservation of Energy (Constant Velocity Motion, Falling, Normal Force & Frictional Force, and Collisions)	4 <sup>th</sup> ,5 <sup>th</sup>	3
5.	Midterm Exam	6 <sup>th</sup>	3
6.	Air Track Apparatus (Newton's First, Second, and Third Laws and the Gravitational Acceleration)	7 <sup>th</sup> ,8 <sup>th</sup>	3
7.	Potential Energy (Elastic & Gravitational Energy and Pendulum)	9 <sup>th</sup>	3
8.	Oscillations (Measuring Spring Constants, Oscillation Frequency of an Extended System, Simple Pendulum)	10 <sup>th</sup>	3
9.	Predicting Non-repetitive Motion (Motion in a Fluid, Circular Motion, and Two-Dimensional Motion)	11 <sup>th</sup>	3
<b>Number of Weeks /and Units Per Semester</b>		<b>11</b>	<b>33</b>

<b>C - Tutorial</b>			
<b>Order</b>	<b>Tasks/ Tutorial</b>	<b>Number of Weeks</b>	<b>Contact hours</b>
1.	Units, measurements and vectors	1 <sup>st</sup> ,2 <sup>nd</sup>	4
2.	Newton's Laws of Motion.	3 <sup>rd</sup>	2
3.	Fluid Mechanics	4 <sup>th</sup> ,5 <sup>th</sup>	4
4.	Properties and Performance of Engineering Materials	6 <sup>th</sup>	2
5.	Heat Transfer.	7 <sup>th</sup>	2
6.	Simple Harmonic Motion.	8 <sup>th</sup> ,9 <sup>th</sup>	4
7.	Wave Motion and Waves on a String.	10 <sup>th</sup>	2
8.	Sound Waves.	11 <sup>th</sup>	2
9.	Light Waves	12 <sup>th</sup>	2

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10.	Geometrical Optics	13 <sup>th</sup>	2
11.	Electric field	14 <sup>th</sup>	2
<b>Number of Weeks /and Units Per Semester</b>		<b>14</b>	<b>28</b>

<b>VI. Teaching strategies of the course:</b>			
<ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Examples</li> <li>▪ Discussion</li> <li>▪ Laboratory</li> <li>▪ Individual and group Projects</li> </ul>			

<b>VII. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	3 <sup>th</sup>	1.5
2.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	6 <sup>th</sup>	1.5
3.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	9 <sup>th</sup>	1.5
4.	Assignments	a1, a2, b1,b2, c1,c2,d1,d2	12 <sup>th</sup>	1.5
<b>Total</b>				<b>6</b>

<b>VIII. Schedule of Assessment Tasks for Students During the Semester:</b>				
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
	<b>Theoretical</b>		70	100%
1.	Assignments	3,6,9,12	6	8.6%
2.	Attendance & Participation	1-14	4	5.7%
3.	Essay/Report		3	4.3%

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4.	Quizzes	Every 2 weeks	5	7.1%
5.	Midterm exam	8 <sup>th</sup> week	10	14.3%
6.	Final Exam	16 <sup>th</sup>	42	60%
	<b>Practical</b>		30	100%
1.	Participation (Attendance & Group Discussion)	Weekly	1.5	5%
2.	Essay/Report	Weekly	1.5	5%
3.	Exercises & Homework	Weekly	1.5	5%
4.	Midterm Exam	6 <sup>th</sup> Lab	6	20%
5.	Quiz	5 <sup>th</sup> Lab	1.5	5%
6.	Final Exam (practical)		18	60%
	<b>Total</b>		<b>100</b>	<b>200%</b>

<b>IX. Learning Resources:</b>	
<i>Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).</i>	
1- Required Textbook(s) ( maximum two ).	
	<ol style="list-style-type: none"> <li>1. Serway and Jewett, Physics for Scientists and Engineers, 9th edition, Cengage Learning, 2014</li> <li>2. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of physics, , 9th ed., John Wiley, 2011</li> </ol>
2- Essential References.	
	<ol style="list-style-type: none"> <li>1. Jearl Walker, Fundamentals of Physics-8th edition, John Wiley &amp; Sons, 2007</li> </ol>
3- Electronic Materials and Web Sites etc.	
	-

<b>X. Course Policies:</b>	
1.	<b>Class Attendance:</b>

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	A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring <b>an approved</b> statement from university Clinic
2.	<b>Tardy:</b> For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.
3.	<b>Exam Attendance/Punctuality:</b> A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam-
4.	<b>Assignments &amp; Projects:</b> The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-
5.	<b>Cheating:</b> For cheating in exam, a student will be considered as <b>failure</b> . In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty-
6.	<b>Plagiarism:</b> Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee <b>proved</b> a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
7.	<b>Other policies:</b> - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination. Lecture notes and assignments my given directly to students using soft or hard copy

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