

COURSE TEMPLATE

1.	Department/Centre proposing the course	PHYSICS	
2.	Course Title (< 45 characters)	PHYSICS LABORATORY	
3.	L-T-P structure	0-0-4	
4.	Credits	2	
5.	Course number	PHP 100	
6.	Status (category for program)	BASIC SCIENCE CORE	

7.	Pre-requisites (course no./title)	NONE	
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8.	Status vis-à-vis other courses (give course number/title)		
8.1	Overlap with any UG/PG course of the Dept./Centre	NO	
8.2	Overlap with any UG/PG course of other Dept./Centre	NO	
8.3	Supercedes any existing course	NA	

9.	Not allowed for (indicate program names)		
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10.	Frequency of offering	☒ Every sem ☐ 1 st sem ☐ 2 nd sem ☐ Either sem	
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11.	Faculty who will teach the course All Faculty of the Department		
12.	Will the course require any visiting faculty?	NO	

13.	Course objective (about 50 words): To provide hands-on-experience and in-depth understanding of the basic concepts by performing planned experiments and doing analysis & interpretation of the observed data. Learning of the error analysis will be done..		
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14.	Course contents (about 100 words) (Include laboratory/design activities): Experiments based on Design & Study of Power sources, Charging & Discharging of a capacitor, Electromagnetic Induction, Phase measurement. Experiments on geometrical and wave optics including interference, diffraction, dispersion and polarization. Experiments based on mechanics, heat, sound, fluids, resonance, like linear air track, coupled pendulum & oscillators, thermal conductivity, elasticity. Experiments in the area of modern physics, like Planck's constant, Lasers, semiconductor band gap, wave motion, mechanical transmission line..		
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15. Lecture Outline *(with topics and number of lectures)*

Module no.	Topic	No. of hours
1		
2		
3		1
4		
5		
6		
7		
8		
9		
10		
11		
12		
COURSE TOTAL (14 times 'L')		

16. Brief description of tutorial activities

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17. Brief description of laboratory activities

Module no.	Experiment description	No. of hours
1	Experiment on Error Analysis	4
2	Experiments on Electricity & Magnetism	12
3	Experiments on Optics	12
4	Experiments on Heat, Mechanics, Sound, Fluids, Resonance	12
5	Experiments on Modern Physics	12
6	Lab Exam	4
7		
8		
9		
10		
COURSE TOTAL (14 times 'P')		56

18. Suggested texts and reference materials

STYLE: Author name and initials, Title, Edition, Publisher, Year.

1. Physics Through Experiments by Saraf and Lokanathan
2. Practical Physics by Worsnop and Flint

19. Resources required for the course *(itemized & student access requirements, if any)*

19.1	Software	
19.2	Hardware	
19.3	Teaching aides (videos, etc.)	
19.4	Laboratory	
19.5	Equipment	
19.6	Classroom infrastructure	

19.7	Site visits	
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20. Design content of the course *(Percent of student time with examples, if possible)*

20.1	Design-type problems	
20.2	Open-ended problems	
20.3	Project-type activity	
20.4	Open-ended laboratory work	
20.5	Others (please specify)	

Date: 28 January 2013


(Signature of the Head of the Department)

15. Lecture Outline (with topics and number of lectures)

Module no.	Topic	No. of hours
1	Electric and magnetic field vectors in a medium, Susceptibility and Conductivity, Maxwell's equations, Boundary conditions.	3
2	EM wave equation, Plane wave solutions, Polarization of the EM waves, Poynting vector and intensity of the EM wave.	3 + 1 problem solving session
3	Wave packet, Phase and Group velocities.	2
4	Reflection and refraction of EM waves at a dielectric interface.	4 + 1 problem solving session
5		
6	Brewster angle, Total internal reflection at a dielectric interface.	1
7	EM waves in a conducting medium and plasma.	3 + 1 problem solving session
8	Wave-particle duality, de-Broglie waves,	2
9	Quantum mechanical operators	2 + 1 problem solving session
10	Schroedinger equation, Wave function, Statistical interpretation, Superposition Principle. Continuity Equation for probability density.	5 + 1 problem solving session
11	Stationary states, Bound states, Free-particle solution, 1-D infinite potential well, Expectation values and uncertainty relations.	5 + 1 problem solving session
12	1-D finite potential well, Quantum mechanical tunneling and alpha-decay, Kronig-Penny model and emergence of bands..	5 + 1 problem solving session
COURSE TOTAL (14 times 'L')		42

16. Brief description of tutorial activities

Includes 6 hr of problem solving sessions.

17. Brief description of laboratory activities

Module no.	Experiment description	No. of hours
1		
2		
3		
4		
5		
6		
7		

8		
9		
10		
COURSE TOTAL (14 times 'P')		

18. Suggested texts and reference materials

STYLE: Author name and initials, Title, Edition, Publisher, Year.

1. David Griffiths: Introduction to Electrodynamics
2. David Griffiths: Introduction to Quantum Mechanics.
3. Robert Eisberg and Robert Resnick : Quantum Physics.

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20. Design content of the course (*Percent of student time with examples, if possible*)

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