Record of percentage change in Syllabus

Name of the Department : PHYSICS, P.U.

Name of the Program: M. Sc.

Paper No	Name of Paper	Whether included in year 2013-14 (Yes/No)	Whether included in year 2017-18 (Yes/No)	Percentage revised in Content #	Year of introduction or revision*	Remark (pls. mark which paper is a value added or skill development paper)
1	Classical Mechanics and Electrodynamics	Yes	Yes	60%	2015	
2	Computational Methods in Physics	Yes	Yes	4%	2015	Skill development
3	Quantum Mechanics I	Yes	Yes	8%	2015	
4	Practical (Computational Method)	Yes	Yes			Skill development
5	Mathematical Physics	Yes	Yes	0%	2015	
6	Quantum Mechanics II	Yes	Yes	0%	2015	
7	Electronics	Yes	No			
8	Electronics I	No	Yes			
9	Practical (Electronics)	Yes	No			
10	Practical (Optics)	No	Yes			Skill development
11	Atomic and Molecular Physics	Yes	Yes	40%	2015	
12	Condensed Matter Physics	Yes	Yes	16%	2015	
13	Elective Paper I (Old)	Yes	No			
14	Electronics II	No	Yes			
15	Practical Core Physics	Yes	No			
16	Practical (Electronics)	No	Yes			Skill development
17	Thermodynamics and Statistical Mechanics	Yes	Yes	20%	2015	
18	Nuclear and Particle Physics	Yes	Yes	50%	2015	
19	Elective Paper II (Old)	Yes	No			
20	Elective Practical and Dissertation (Old)	Yes	No			
21	Elective Paper I (New)	No	Yes			
22	Elective Paper II (New)	No	Yes			
Spl. Papers		(Elective Paper I Old)				
23	Plasma Physics	Yes	No			
24	Analog and Digital Electronics	Yes	No			
	(Elective paper II old)					
25	Laser and Photonics	Yes	No			
26	Measurement and Instrumentation	Yes	No			
	Elective papers (Practical + Dissertation) Old					

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27	Laser and Spectroscopy	Yes	No		
28	Measurement and Instrumentation	Yes	No		
	Elective paper I (New)				
29	Measurement and Instrumentation	No	Yes		
30	Laser and Photonics	No	Yes		
	Elective Paper II (New)	Part I: Practical	Part II: Dissertation		
31	Measurement and Instrumentation	No	Yes		
32	Laser and Photonics	No	Yes		
Overall Change = Total Change in Percentage/Number of Papers offered in Year 2017-18 (11% overall change)					

Please Consult the attached performa for filling-up the data.

*Mention all the years in which revisions have been carried out even in case of course/paper.

Signature

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Performa for Filling-Up Data Related to the Revision in Courses/Paper

Details of changes made in courses of PG Department of **Physics** in last five years (2013-17)

Name of the Programme: **M.Sc. Physics**

Paper No	Name of the Course/Paper with Code	Details of the removed content	Details of the added content
1.	Classical Mechanics and Electrodynamics (Code: M-PHY-101)	Hamilton's equations-Cyclic variables- Principle of least action – Equations of canonical transformations – Lagrange and Poisson Bracket notation – Infinitesimal contact transformation – Constants of motion and symmetry properties. Hamilton – Jacobi equations – Linear Harmonic Oscillator problem by Hamilton- Jacobi method- Action Angle Variables- Application to Kepler's problem. Oscillation motion – Theory of small oscillation – Linear Triatomic Molecule – Stability of Oscillatory motion- Forced Harmonic Oscillator – non-linear Oscillation in a symmetric potential. Linear and Circular acceleration, Bremsstrahlung, Synchrotron radiation and Cerenkov radiation.	Hamilton's equation in different co-ordinate systems, Examples of Hamiltonian Dynamics (harmonic oscillator: 1& 2 D, Motion of a particle in central force field, Charged particle in an electromagnetic field, Compound pendulum, Calculus of variation (Euler Lagrange equation) and Modified Hamilton''s Principle (its derivation from D'Alembert's Principle), Derivation of Hamiltonian's Canonical equations from modified Hamiltonian principle, Δ-variation and principle of least path in differential forms. Canonical transformation through four generating functions with various examples. Infinitesimal contact transformation, Integral invariance of Poincare', Poisson's and Lagrange Brackets and its properties, Invariance with respect to C.T., Liouville's theorem. Two coupled oscillators, Normal modes and coordinates with examples, General theory of small oscillations, Solution of eigenvalue equation with reference to triatomic molecule. Hamilton Jacobi theory and transition to quantum mechanics.
2.	Computational Method in Physics (Code: M-Phy-102)		Simulation of simple Physical Problems

3.	Quantum Mechanics I (Code: M-Phy-103)	Basic concepts regarding elementary, quasi and virtual particles, Reciprocal transformability	
4	Atomic and Molecular Spectra (Code: M-Phy-301)	Spin Orbit interaction and Hydrogen fine structure, Lamb Shift, Hyperfine splitting of spectral lines, Selection rules, Many electron system, L-S and J-J coupling, energy levels and spectra, Spectroscopic terms, Hund's rule, Lange-g factor' Molecular as Anharmonic Oscillator and as vibrating system, Frank-Condon Principle, Fortran diagram, Concept of Molecular potential, Separation of electronic and nuclear wave function, NMR and ESR with their application, technique and instrumentation. Significance of Einstein's A and B coefficients, pumping schemes, Characteristic of Laser beams, Laser transitions.	
5	Condensed Matter Physics (Code: M-Phy-302)	Dielectric polarization, Ferro-electric crystals, Optical properties of crystals.	Microscopic concept of dielectric polarization, Langevin theory of Polarization, Dielectrics in Alternating field, Complex Dielectric Constant and dielectric loss, Ferro-electricity, Optical Properties of solids.
6	Thermodynamics and Statistical Mechanics (Code: M-Phy-401)	One dimensional Ising model, Introduction to non equilibrium processes, Diffusion equation	Features of equilibrium and non-equilibrium thermodynamics, linear theory of non-equilibrium thermodynamics, current and affinity, Onsagar relation, Fluctuations, Microsystems.
7.	Nuclear and Particles Physics (Code: M-Phy-402)	Yukawa interaction, Cross sections in terms of partial wave amplitudes, "Direct" and "Compound" nucleus Shell model, Deformed Shell model, Nilson Model, Ground state quardrupole moment,	Meson theory of Nuclear forces, Nuclear reactions and Cross sections, Theory of compound nucleus Single Particle Shell model, Nilson Unified Model, Fermi theory of beta decay,

		Back-bending phenomena Fermi theory, Fermi and G.T. beta transitions, Kurie plots, Comparative Half life, Electron capture, Theory of gamma decay, Multipole fields, transition rules. Classification of fundamental forces, Phenomenology of elementary particles, Charge independence of strong interactions, Gell-Mann classification of elementary particles.	Radiative transitions in nuclei. Conservation laws and symmetry, CPT invariance, Classification of elementary particles

S.C. Mishra

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Record of percentage change in Syllabus

Name of Department: Department of Physics, Patna University

Name of the Program: M.Sc. Physics

Paper No	Name of Paper	Whether included in year 2013-14 (**Yes/No**)	Whether included in year 2017-18 (**Yes/No**)	Percentage revised in Content #	Year of introduction of revision*	Remark (pls. mark which paper is a value added or skill development paper)
01	Classical Mechanics and Electrodynamics	Yes	Yes	60%	2015	
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09	Practical (Electronics)	Yes	No			
10	Practical (Optics)	No	Yes			
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12	Condensed Matter Physics	Yes	Yes	16%	2015	
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14	Electronics II	No	Yes			
15	Practical Core Physics	Yes	No			
16	Practical (Electronics)	No	Yes			
17	Thermodynamics and Statistical Mechanics	Yes	Yes	20%	2015	Skill Development
18	Nuclear and Particle Physics	Yes	Yes	50%	2015	
19	Elective Paper II (Old)	Yes	No			
20	Elective Practical and Dissertation (Old)	Yes	No			
21	Elective Paper I (New)	No	Yes			
22	Elective Paper II (New) Part I: Practical Part II: Dissertation	No	Yes			
Special Papers:		(Elective Paper I Old)				
23	Plasma Physics	Yes	No			
24	Analog and Digital Electronics	Yes	No			
		(Elective paper II old)				
25	Laser and Photonics	Yes	No			
26	Measurement and Instrumentation	Yes	No			

Elective papers (Practical + Dissertation) Old						
27	Laser and Spectroscopy	Yes	No			
28	Measurement and Instrumentation	Yes	No			
Elective paper I (New)						
29	Measurement and Instrumentation	No	Yes			Skill development
30	Laser and Photonics	No	Yes			Skill development
Elective Paper II (New) Part I: Practical Part II: Dissertation						
31	Measurement and Instrumentation	No	Yes			Skill development
32	Laser and Photonics	No	Yes			Skill development
Over all change = 11 %						

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