1.1.3

List of Employability/ Entrepreneurship/ Skill Development Courses with Course Contents

Colour Codes		
Employability Contents	**Green**	
Entrepreneurship Contents	**Light Blue**	
Skill Development Contents	**Pink**	
Name of the Subjects/Related to all three Components (Employability/ Entrepreneurship/ Skill Development)	**Yellow**	

List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Pure and applied physics*

Programme Name : *B.Sc. (Hon.) Physics*

Academic Year : 2016-17

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	BP-302	**Basic Electronics**
02.	BP-501	**Optical instruments and techniques**
03.	BP-604	**Elements of Nano Science**

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Dept. of Pure & Applied Physics
गुरु घासीदास विश्वविद्यालय
Guru Ghasidas Vishwavidyalaya
बिलासपुर (छ.ग.)/Bilaspur (C.G.)

Scheme and Syllabus

5 Year Integrated U.G. in Physics			
Semester-I	**Marks**	**Semester-III**	**Marks**
BP-101 Mechanics & properties of matter	50	BP-301 Heat & Thermodynamics	50
BP-102 Electromagnetic Theory-I	50	BP-302 Basic Electronics	50
BP-103 Lab-I	50	BP-303 Lab-III	50
Semester-II	**Marks**	**Semester-IV**	**Marks**
BP-201 Kinematics and Oscillations	50	BP-401 Optics	50
BP-202 Electromagnetic Theory-II	50	BP-402 Modern Physics	50
BP-203 Lab-II	50	BP-403 Lab-IV	50
Semester-V	**Marks**	**Semester-VI**	**Marks**
BP-501 Optical instruments and techniques	50	BP-601 Atomic and Molecular Physics	50
BP-502 Mathematical Physics	50	BP-602 Basic Nuclear Physics	50
BP-503 Basic Quantum mechanics	50	BP-603 Solid State Physics-II	50
BP-504 Solid state physics-I	50	BP-604 Elements of Nano Science	50
BP-505 Lab-V	50	BP-605 Lab-VII	150
BP-506 Lab-VI		BP-606 Project Work	

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Paper VIII (BP-302): Basic Electronics

Unit I:

Loop and Nodal analysis of d.c. and a.c. circuits (based on Kirchhoff Laws), Network theorems: Thevenin, Norton, and Maximum power transfer theorem.

Unit II:

Fundamentals of semiconductors, P-N Junctions and junction Diode, junction breakdown, Zener Diode,

Unit III:

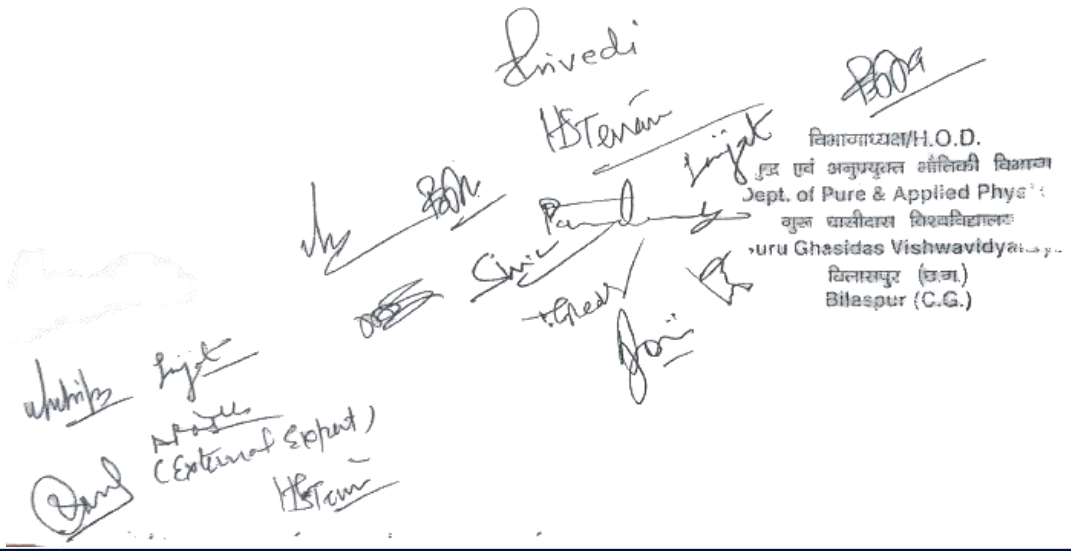
Rectification; Half-Wave and full wave, and Regulation, Filters, Regulated Power Supply

Unit-IV:

Basic ideas of bipolar devices, operation, different configuration and characteristics, Transistor h-parameters, Concept of d.c. and a.c. load lines, cut off saturation, BJT as amplifier

References:

1. Principles of Electronics by Mehta V.K.
2. Elements of Electronics by Bagde and Singh S.P.
3. Basic Electronics by Thareja B.L.
4. Basic Electronics, by Grob B., McGraw Hill, NY,1989 Edition



Semester V Paper XIII (BP-501): Optical Instruments and Techniques

Unit –I Introduction, review of abberations, the compound microscope, microscope objective, dark field illumination, telescopes, the astronomical reflecting telescope, oculars or eye-piece, types of eyepiece: Ramsden and Huygens eye-piece, comparison of Ramsden and Huygens eye-piece.

Unit –II Diffraction grating: construction, theory of diffraction grating, principal maxima and minima, grating equation, characteristics of grating, determination of wavelength of light with diffraction grating, difference between grating and prism.

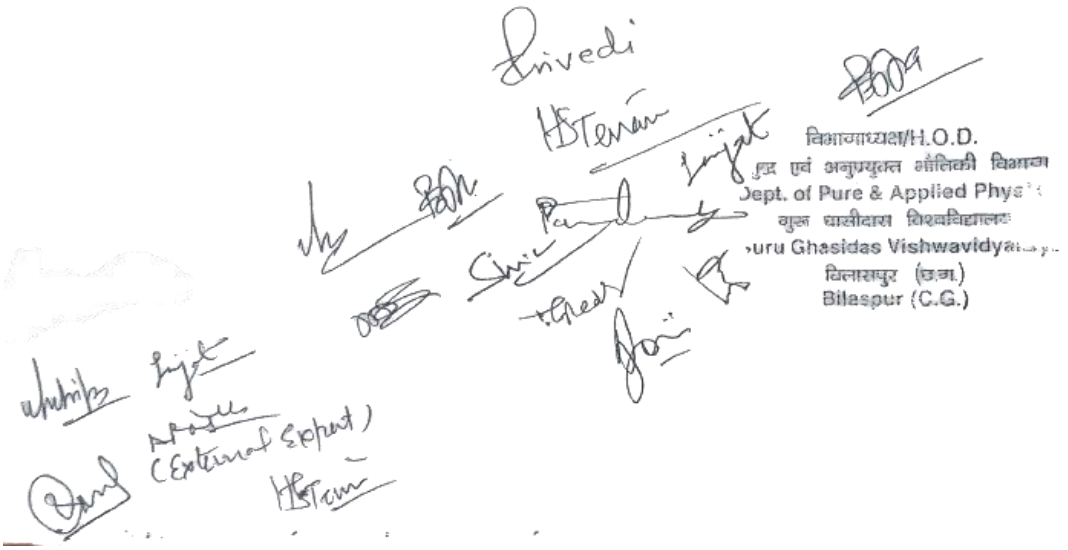
Unit –III Resolving power of optical instruments, Rayleigh's criteria for limit of resolution, resolving power of telescope, experimental determination of resolving power of telescope, resolving power of microscope, resolving power of plane transmission grating

Unit –IV Spectrometer, measurements of refractive index and dispersive power of a prism, Polarimeters: Laurent half shade polarimeter, Biquartz polarimeter, Lippich's two prism polarizer, determination of specific rotation of sugar solution of using Laurent half shade polarimeter

References: 1. Optics- Brijlal and Subramayam N.

2. Geometrical and Physical Optics –Mathur B.K.

3. Optics –Sharma J.K. and Sarkar K. K.



Paper XXII (BP-604): Elements of Nanoscience

Unit I: Introduction to Nanoscience and nanotechnology Introduction to nanotechnology and importance of nanoscience, summary of electronic properties of atoms and solids (qualitative), Modifications in properties of materials due to nanoscale dimensions.

Unit II: Synthesis and characterization of nanomaterials Physical and Chemical Synthesis of Nanomaterials, Top – down approach (CVD) and Bottom – up approach (sol – gel process), wet – deposition techniques (spin coating and dip coating), Structure and imaging of nanomaterials: XRD, scanning and tunneling electron microscopies; & SPM (qualitative)

Unit III: Topics on some important classes of nanomaterials Metal Nanoparticles, Carbon Nanostructures – fullerene, carbon nanotubes and graphene (introduction); low dimensional semiconductors – 0D, 1D, 2D & 3D systems, quantum wells, wires and dots (introduction) - Quantum confinement in semiconductor nanostructures (qualitative) - The electronic density of states; Characterization of semiconductor nanostructures and applications of semiconductor nanostructures

Unit IV: Applications of nanotechnology Societal Implications of Nanoscience and Nanotechnology, important applications of nanomaterials (energy, sensors, electronics and medicine) and Future directions of nanotechnology

Text books:

1. Introduction to Nanotechnology, Charles P. Poole & Frank J. Owens

2. Introduction to Nanoscience and Nanotechnology, K.K.Chattopadhyay and A.N.Banerjee