गुरू घासीदास विश्वविद्यालय (क्रेडेर विसविवास अधिम 2009 इ. 25 के संगंध साथिर केडेर विश्वविद्याल) कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Ant 2009 No. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

# List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department		: Pure and applied physics			
Progr	ramme Name	: B.Sc. (Hon.) Physics			
Academic Year : <mark>2016-17</mark>					
List of Courses Focus on Employability/ Entrepreneurship/Skill Development					
· · · · ·					
Sr. No.	Course Code	Name of the Course			
	<b>Course Code</b> BP-302				
Sr. No.		Name of the Course			



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# Scheme and Syllabus

5 Year Integrated U.G. in Physics					
Semester-I	Marks	Semester-III	Marks		
BP-101 Mechanics & properties of	50	BP-301 Heat & Thermodynamics	50		
matter	50	BP-302 Basic Electronics	50		
BP-102 Electromagnetic Theory-I	50	BP-303 Lab-III	50		
BP-103 Lab-I					
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	50	BP-601 Atomic and Molecular	50		
techniques	50	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			

गुरू घासीदास विश्वविद्यालय (क्रेन्न किलीवलर अधिमर 2009 ह. 25 के संगंत साहित केन्द्रेर किलीवलर) कोनी, बिलासपुर - 495009 (छ.ग.)



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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



Courses Focus on Employability/Entrepreneurship/Skill Development

Criteria - I (1.1.3)

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Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Art 2009 No. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

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.

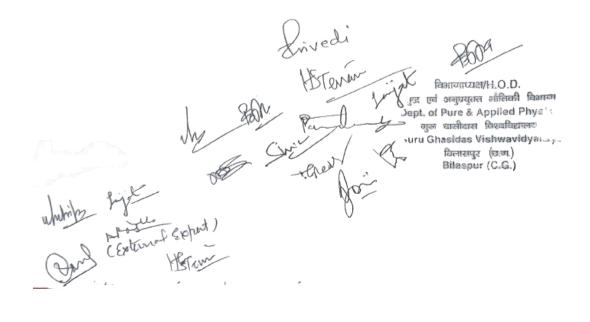
Unit –III Resolving power of optical instruments, Rayleigh's criteria for limit of resolution, resolving power of telescope, experimental determination of resolving power of telescope, resolving power of plane transmission grating

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.



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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

