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.) Electronics*

Academic Year : 2017-18

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	BE-302	Basic Electronics- III
02.	BE-501	Microprocessor & microcontroller
03.	BE-503	Electronic Instrumentation & Digital Signal Processing
04.	BE-504	Analog Communication -I
05.	BE-601	Analog Communication-II
06.	BE-602	Digital Communications
07.	BE-603	Advanced Electronic Instrumentation
08.	BE-604	Fiber Optics and Optoelectronics

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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 Electronics

Semester-I	**Marks**	**Semester-III**	**Marks**
BE-101 Network theorem & AC circuits	50	BE-301 Digital Electronics- II	50
BE-102 Basic electronics –I	50	BE-302 Basic Electronics- III	50
BE-103 Laboratory-I	50	BE-303 Lab-III	50
Semester-II	**Marks**	**Semester-IV**	**Marks**
BE-201 Digital Electronics-I	50	BE-401 Electromagnetic Theory	50
BE-202 Basic Electronics –II	50	BE-402 Numeric Technique	50
BE-203 Laboratory-II	50	BE-403 Laboratory-IV	50
Semester-V	**Marks**	**Semester-VI**	**Marks**
BE-501 Microprocessor & microcontroller	50	BE-601 Analog Communication-II	50
BE-502 Wave propagation	50	BE-602 Digital Communications	50
BE-503 Electronic Instrumentation & Digital Signal Processing	50	BE-603 Advanced Electronic Instrumentation	50
BE-504 Analog Communication -I	50	BE-604 Fiber Optics and Optoelectronics	50
BE-505 Laboratory-V	50	BE-605 Laboratory-VII	50
BE-506 Lab.-VI		BE-606 Project Work	150

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Paper VIII (BE-302): BASIC Electronics -III

UNIT-I

Tuning circuit: parallel resonant circuit, quality factor, frequency response and bandwidth, decibel system, tuned amplifier, Single Stage Amplifiers, Output Power of Amplifier, classification of amplifiers

UNIT-II

Class A, class B and class C amplifiers, push pull amplifier, Multistage Amplifiers: R-C coupled, Impedance coupled, Transformer-Coupled and Direct-Coupled Amplifiers

UNIT-III

Feedback in amplifiers: principal of positive and negative feedback, gain of negative feedback amplifier, advantage of negative feedback in amplifiers

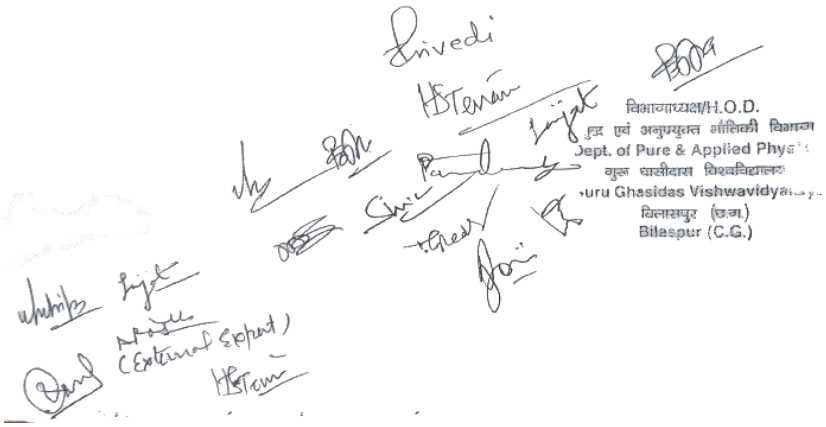
Oscillators: principle of oscillators, circuit requirement for self excited oscillations, basic analysis of Phase Shift, Hartley, Colpitt and Wien bridge oscillators.

UNIT-IV

Operational amplifiers: requirements of an ideal OP-amplifier, gain of inverting and non-inverting OP-amplifier, basic idea of common mode gain, difference gain, common mode rejection ratio, application of OP-amplifier (addition, multiplication, integration and differentiation)

References:

1. OP-AMP and Linear Integrated Circuits: Gayakwad
2. Electronic Fundamentals and Applications: J.D. Ryder
3. Electronic circuit Analysis: U.A. Bakshi
4. Electronic Principles: A. Malvino & David J. Bates



Semester V
Paper-XIII (BE-501): Microprocessors and Microcontrollers

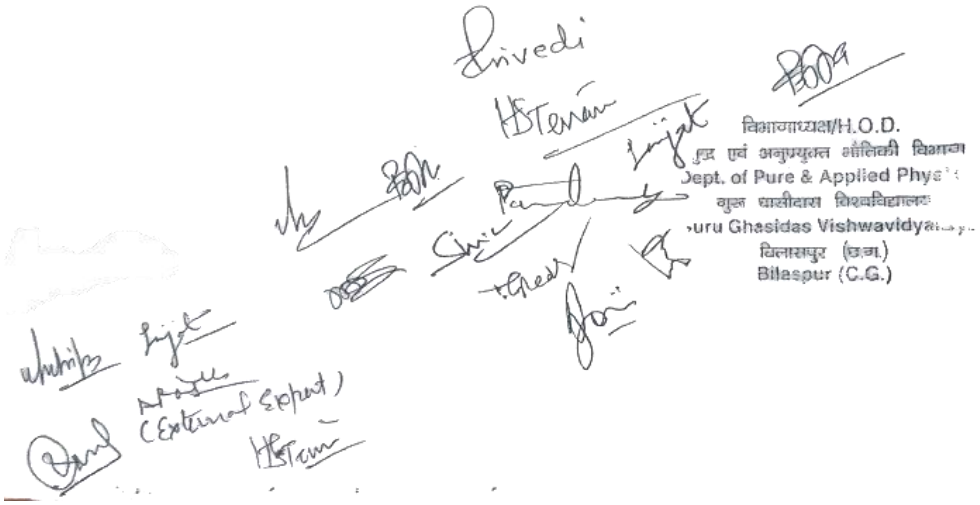
Unit I:Fundamentals of Microprocessors:
Introduction, An ideal microprocessor, the data bus, address bus, control bus, microprocessor based system- basic operation, microprocessor operation, microprocessor architecture, instruction set, 8085 and 8086 microprocessor

Unit II: Programming of microprocessors: Introduction, assembly languages, High-Level Language,
application of various language, stacks, subroutines, system software, Programmable DMA controller, Programmable interrupt controller (PIC), programmable communication interface

Unit III: Microprocessor based data Acquisition system: Introduction, analog to digital convertor,
clock for A/D convertor, sample and Hold circuit, Analog multiplexer, ADC 0800,

Unit IV: Microprocessor applications: Delay subroutines, 7-segment LED display, Microprocessor
based protective relay, Microcomputer development system, single chip microcomputer, I/O processor, Coprocessor.

References:
1. Fundamental of Microprocessor and microcomputers by B. Ram
2. Digital Computer Electronics- an introduction to microcomputers by A. P. Malvino
3. Digital Computer Electronics by Malvino and Brown



Paper XV (BE-503): Analog Communication I

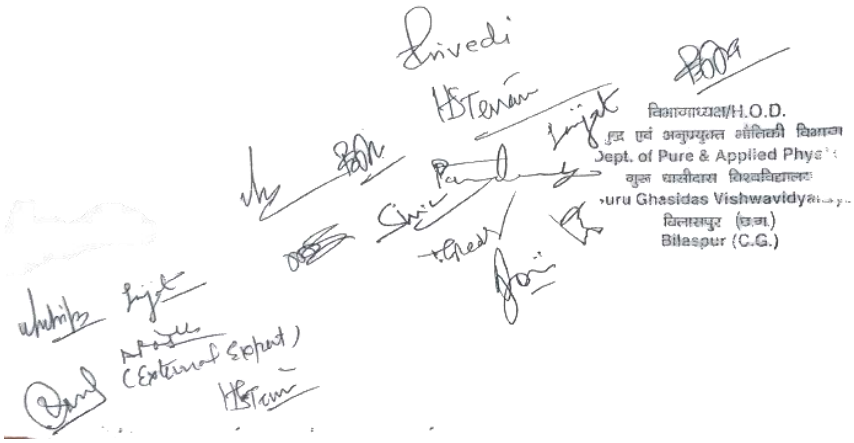
Unit I: Waveform spectra and Noise
Introduction, sinusoidal wave forms, fourier series for a periodic waveform, fourier coefficients,
spectra for the trigonometric Fourier series, rectangular and saw tooth waveform, general properties of periodic waveforms, exponential Fourier series, Noise, types of noise e.g. external
noise, internal noise, noise calculation, noise figure noise temperature.

Unit II: Communication system & Block diagram
Introduction, components of communication system: amplifier, transmitter, channel receiver, band spectrum modulation, types of modulation, modulation factor importance of modulation factor, forms of modulation.

Unit III Angle modulation: Frequency and Phase modulation, frequency spectrum, bandwidth
requirement, Frequency and Phase Deviation, Modulation Index, NBFM and WBFM, Multiple
frequencies FM, equivalence between FM and PM, Generation of FM, FM detector.

Unit IV Amplitude modulation: modulation index, frequency spectrum, generation of AM (balanced
modulator, collector modulator), Amplitude Demodulation (diode detector). Double side band
suppressed carrier (DSBSC) generation, Single side band suppressed carrier (SSBSC) generation.

References:
1. Analog and Digital Communication Systems by Roden
2. Electronic Communication by Roddy Coolen
3. Modern Electronic Communication by Miller, Beasley
4. Electronic Communication System by Schweber



Paper XVI (BE-504): Electronic Instrumentation & Digital Signal Processing

Unit I Basic Measurement Instruments: DC measurement: dc voltmeter, ohmmeter and ammeter. Digital type voltmeter, ammeter and ohmmeter, digital multimeter, AC measurement, voltmeter,
ammeter. Digital frequency meter: elements of frequency meter, universal counter and its different modes, measurement errors and extending the frequency range. Digital LCR-Q meter,
digital wattmeter.

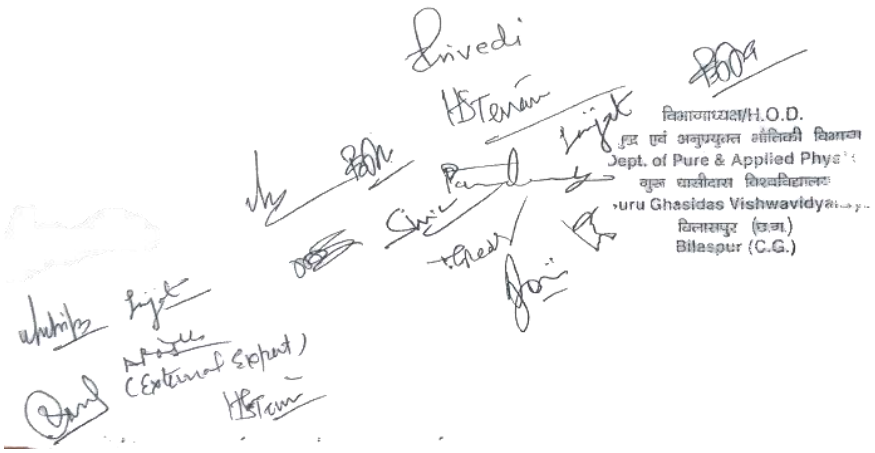
Unit II Signal Generators: Types of generators and their operation: The sine wave generator, Audio
oscillator, Function generators, Pulse generators, AF signal generator, RF generators, Random
noise generators.

Unit III Probes and Connectors: Test leads, active and passive probes, shielded cables, connectors, low
capacitance probes, high voltage probes, RF demodulator probes, special probes for IC's, current
probes.

Unit IV: Digital Signal Processing (DSP): Introduction to signals, signal processing systems, concept of
signal processing, basic elements of digital signal processing (DSP), comparison between DSP
and analog signal processing

References:

1. Electronic Instrumentation by H.S. Kalsi
2. Elements of Electronic Instrumentation and Measurement by Joseph J. Carr
3. Instrumentation Devices and Systems by C.S.Rangan, G.S.Sarna and V.S.Man
4. Digital Signal Processingby Oppenheim and Schafer



Semester VI
Paper XIX (BE-601) **Analog Communications – II**

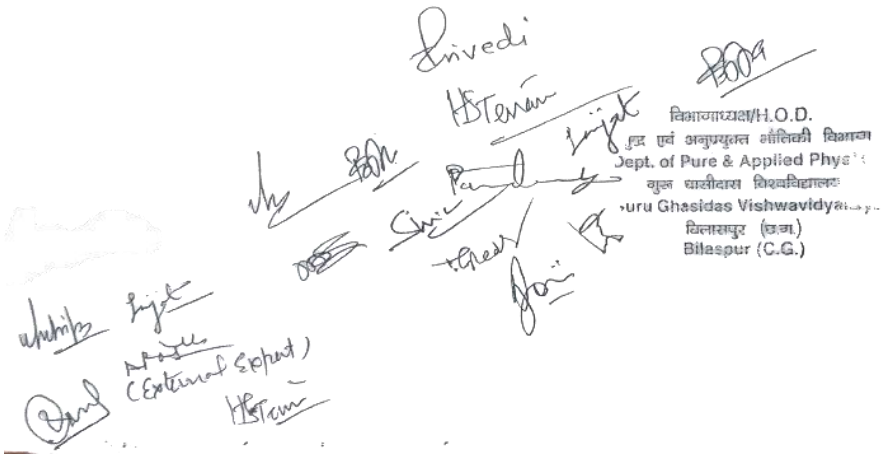
Unit I Demodulation/ Detection, essentials of AM detection, diode detector for AM signals, transistor detector for AM signals, FM detection, Qudrature detector, radio receivers, difference between FM and AM receiver, Discriminator Detector, PAM Demodulators.

Unit II: Transmitters & Receivers
Transmitters: AM transmitter, block diagram and working of Low Level and High Level Transmitters, FM transmitter **Receivers:** Block Diagram of Receiver, Receiver parameters: sensitivity, selectivity and fidelity, Super Heterodyne Receiver, Double Conversion Receiver. AM receivers, FM receivers.

Unit III: Transmission line & cable
Transmission line, line constants, phase velocity and line wavelength, characteristics impedence, propagation coefficient, phase and group velocities, standing waves, lossless lines at radio frequencies, voltage standing wave ratio, transmission lines as circuit elements, smith chart

Unit IV: Propagation of Radio waves:
Propagation in free space, tropospheric propagation, Ionospheric propagation, surface wave, low frequency propagation, and very low frequency propagation, extremely low frequency propagation

References:
1. Analog and Digital Communication system by Roden
2. ElectronicCommunication System by Schweber
3. Electronic Communications by Roddy and Coolen



Paper-XX (BE-602): Digital Communication

Unit 1 Pulse Code Modulation: Need for digital transmission, Quantizing, Uniform and Non-uniform Quantization, Quantization Noise, Companding, Coding, Digital Formats. Decoding, Regeneration, Transmission noise and Bit Error Rate. Differential Pulse Code Modulation, Delta Modulation, Quantization noise, Adaptive Delta Modulation. Time Division Multiplexing (TDM), T1/E1 carrier system.

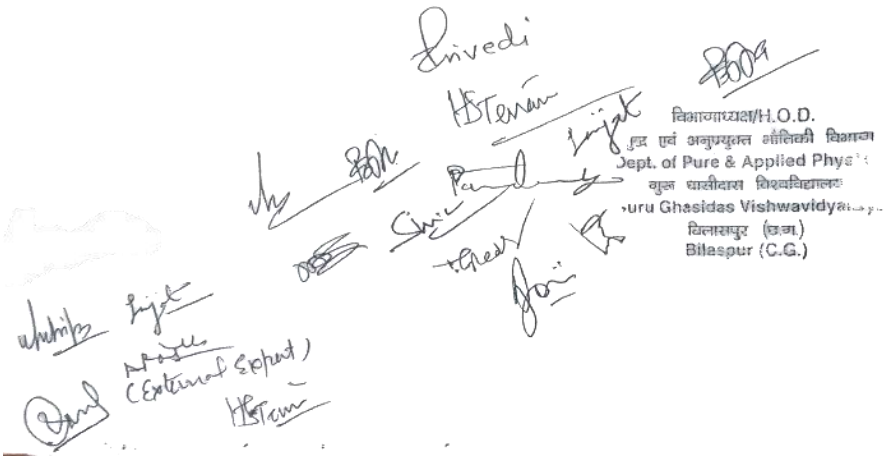
Unit 2 Digital Carrier Modulation Techniques: Block diagram of digital transmission and reception. Information capacity, Bit Rate, Baud Rate and M-ary coding. Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Binary Phase Shift Keying (BPSK) and Quadrature Phase Shift Keying (QPSK).

Unit 3 Multiple Access Techniques: Concept of Frequency Division Multiple Access (FDMA), Code Division Multiple Access (CDMA).

Unit 4 Overview of Modern Communication Systems: Mobile Communication, Satellite Communication and Optical Communication.

Suggested Books:

1. H. Taub and D. Schilling, Principles of Communication Systems, Tata McGraw Hill (1999)
2. W. Tomasi, Electronic Communication Systems: Fundamentals through Advanced, Pearson Education (2004)
3. L. E. Frenzel, Communication Electronics, Principles and Applications, Tata McGraw Hill (2002)



Paper-XXI (BE-603) Advance Electronic Instrumentation

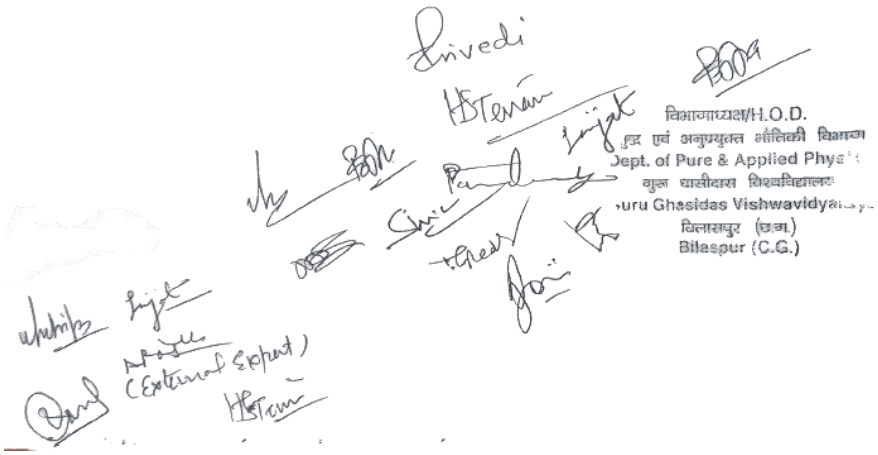
Unit-I Transducers and its classifications, Criteria for selecting a transducer, Active and passive electrical transducer, Strain Gauge, Gauge Factor, Gauge materials and configuration, displacement transducers, capacitor, inductive, Differential transformers (LVDT), photoelectric and piezoelectric transducers, photo sensitive devices, resistance thermometers, thermistors and thermocouples.

Unit – II Introduction to Oscilloscopes, Cathode ray tube, vertical and horizontal deflection system, delay
lines, oscilloscope probes and transducers, elementary ideas about storage and sampling oscilloscope. Applications of oscilloscope.

Unit – III Feedback fundamentals, inverse transducers, temperature balance system, self balancing potentiometers, self balancing bridges, beam balance systems, servo operated manometers, Non contact position measurements.

Unit – IV Data display and recording systems: Data loggers, analog and digital readout systems, Alphanumeric and CRT readout systems, cathode ray oscilloscope as analog recorder, Magnetic tape
recorder, optical and magnetic encoders and decoders, digital I/O devices.

Reference:
1. Transducers and Instrumentation – Murty D V S
2. Modern Electronic Instrumentation and Measurement Techniques – Helfrick A D and Cooper W D
3. Electrical and Electronic Measurements and Instrumentation – Sahney A K
4. Measurement, Instrumentation and Experimental Design in Physics and Enggineering – Sayer and Mansingh



Semester-VI
Paper- XXII- (604): Fiber Optics Communication

Unit I: Fibre Optics: Structure of optical fibres, classification of optical fibres, plastic fibres, light propagation through an optical fibre, acceptance angle and numerical aperture, intermodal dispersion.

Unit II: Fibre losses, calculation of fibre losses, optical fibre cable, splicing and connectors, fusion splices, mechanical splices, connection losses, advantages of optical fibres.

Unit III: Fibre optics communication: Basics of fibre optics, step index fibre, graded index fibre, pulse dispersion in step index fibre, chromatic dispersion and modes of propagation, single mode propagation, losses in fibres, light detectors.

Unit IV: Optoelectronic devices: Introduction of optoelectronic devices, light dependent resistor (LDR), applications of LDR, photo diode, photo transistor, photovoltaic cell or solar cell, light emitting diode (LED), laser diode, applications of optoelectronic devices.

Text Books:
1. Handbook of Electronics: S. L. Gupta and V. Kumar
2. Basic electronics: B. L. Theraja
3. Optical fibre communications by Senior
4. Optoelectronics: An introduction by Wilson and Hawkes