गुरू घासीदास विश्वविद्यालय (केनीय विश्वतिवालय अधिनेयन 2008 क. 25 के अंतर्गत स्वापित केन्द्रेय विश्ववेवालय) कोनी, बिलासपुर - 495009 (छ.ग.)



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

1.2.1

List of New Courses Introduced with Course Contents

	Colour Codes	
Employability Contents	Green	
Entrepreneurship Contents	Light Blue	
Skill Development Contents	Pink	
NameoftheSubjects/Related to allthreeComponents(Employability/Entrepreneurship/ SkillDevelopment)	Yellow	

गुरू घासीदास विश्वविद्यालय (स्वेर विस्तीवाल अभिन 2008 हा 25 के संगंत सामित केन्द्रेर विस्तीवाल) कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Ad 2009 Ma. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

List of New Course(s) Introduced

Department

: Pure and applied physics

Programme Name : B.Sc. Electronics

Academic Year : 2019-20

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	PS/ELEC/C-301P	Electronic Circuits Lab
02.	PS/ELEC/C- 302P	Digital Electronics and VHDL Lab
03.	PS/ELEC/C- 303P	C Programming and Data Structures Lab
04.	PS/ELEC/C-401P	Operational Amplifiers and Applications Lab
05	PS/ELEC/C-403P	Electronics Instrumentations Lab
06.	PS/ELEC/C-303L	C Programming and Data Structures Lab

zathi

विभागाध्यक्षं/H.O.D. शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग Dept. of Pure & Applied Physics गुरु घासीदास विश्वविद्यालय Guru Ghasidas Vishwavidyalaya बिलासपुर (छ.ग.)/Bilaspur (C.G.)

गुरू घासीदास विश्वविद्यालय (नेवे किलेबान बीनिम 2009 ह 25 के संगंत साथि केवेब किलीबान) कोनी, बिलासपुर - 495009 (छ.ग.)



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

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-19

School : School of Physical Sciences

Department : *Pure and Applied Physics*

Date and Time : July 13, 2018 – 11:30 AM; July 18, 2018 – 5:00 PM

Venue

: Smart Class Room

The scheduled meetings of member of Board of Studies (BoS) of Department of Pure and Applied Physics, School of Studies of Physical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, were held to design and discuss the B. Sc. (Physics) Second year (III and IV Semesters), scheme and syllabi.

The following members were present in the meeting:

- 1. Prof. P K. Bajpai
- 2. Dr. H. S. Tewari
- 3. Prof. S. B. Kondawar (External Member)
- 4. Dr. M. N. Tripathi
- 5. Dr. P. Thakur
- 6. Dr. R. K. Pandey
- 7. Dr. T. G. Reddy
- 8. Dr. R. P. Prajapati
- 9. Dr. A. K. Gupta
- 10. Dr. M. P. Sharma
- 11. Dr. P. Das
- 12. Dr. T. Trivedi
- 13. Dr. S. P. Patel
- 14. Prof. R. Dhar (External member)

The committee discussed and approved the scheme and syllabi. The following Skill Enhancement courses were added in the B. Sc. (Physics) Second year (III and IV Semesters):

- ✤ Electronic Circuits Lab
- ✤ Digital Electronics and VHDL Lab
- C Programming and Data Structures Lab
- Operational Amplifiers and Applications Lab
- ✤ Electronics Instrumentations Lab

Jath विभागाध्यक्ष /H.O.D

Signated भारत के किंगि कि मिछ के किंगि के किंगी के क किंगी किं किंगी किं गुरू घासीदास विश्वविद्यालय (हेवे किवेबन अभिन 200 व. 25 हे कंफ लांग हेवेर किवेबन) 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.)

Course Structure & Syllabus of B.Sc. Electronics Session -2019

School of Physical Sciences: B.Sc. Hon's (Electronics)

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / weak
	Core-1	PS/ELEC/C-101L	Basic Circuit Theory and Network Analysis	- 54	4
	Core -1 Practical	PS/ ELEC./C-101P	Basic Circuit Theory and Network Analysis Lab	2	4
	Core -2	PS/ ELEC./C-102L	Mathematics Foundation for Electronics	-4	4
	Core -2 Practical	PS/ELEC/C-P-102P	Mathematics Foundation for Electronics Lab	2	4
	Generic Elective -1 (GE-1A)	PS/ELEC/GE-101	To be opted from the pool*	4	4
	Generic Elective - Practical	PS/ELEC./GE-P-101	GE-101 practical as opted	2	4
	Ability Enhancement Compulsory Course (AECC)	PS/ELEC./AE- 101/EC	English Communication / MIL (Hindi Communication)	4^{\oplus}	4
	ECA	Open elective (Optional)	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			TOTAL	24	28
	Core-3	PS/ ELEC /C-203L	Semiconductor Devices	4	4
	Core -3 Practical	PS/ ELEC /CP-203P	Semiconductor Devices Lab	2	4:
	Core -4	PS/ ELEC /C-204L	Applied Physics	通	4
	Core -4 Practical	PS/ ELEC /CP-204P	Applied Physics Lab	2	4
U	Generic Elective -2 (GE-IB)	PS/ ELEC /GE-202/	GE-102 (second course of the same subject as opted in GE-101	4	4
	Generic Elective - Practical	PS/ ELEC /GE-P-202/	GE-202 practical as opted	2	4.
	Ability Enhancement Compulsory Course (AECC)	PS/ ELEC /AE- 201/ES	Environmental Science	42	4
	ECA	Optional elective	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhua/ vocational Training/ Sports/ others	2	(2)
			Total	24	28





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

SUMN	IER Internship: 15 days	Optional elective	Swayam Swachhta / NSS / Industrial/ others	- 2	100
-	Core-5	PS/ ELEC /C-301L	Electronic Circuits	4	4
	Core -5 Practical	PS/ ELEC /C-301P	Electronic Circuits Lab	-2	4
	Care -6	PS/ELEC/C-3021	Digital Electronics and VHDL	4	4
	Core -6 Practical	PS/ ELEC /C-302P	Digital Electronics and VHDL Lab	2	4
ш	Core - 7	PS/ ELEC /C-303L	C Programming and Data Structures	4	4
	Core - 7 Practical	PS/ELEC/C-303P	C Programming and Data Structures Lab	2	4
	Generic Elective -3 (GEII-A)		To be opted from the pool of GE	.4	4
	Generic Elective - Practical		o to second in twink where the course	2	4
	Skill Enhancement Course (SEC - 1)		To be opted from the pool of SE courses**	4*	2 (4)
	and some of the		Total	28	34
	Corp-8	PS/ ELEC /C-401L	Operational Amplifiers and Applications	- 4	4
īv	Core -8 Practical	PS/ELEC/C-401P	Operational Amplifiers and Applications Lab	2	4
	Core -9	PS/ELEC/C-407P	Signals and Systems	4	4
	Core -9 Practical	PS/ELEC/C-402P	Signals and Systems Signals and Systems Lab		4
	Core - 10	PS/ELEC/C-403L	Electronic Instrumentation	4	1
	Core -10 Practical	PS/ELEC/C-403P	Electronic Instrumentation Lab	2	1
100	Generic Elective -4 (GEII-B)	THE RELACTORY OF	To be opted from the pool of Generic courses	4	4
	Generic Elective - Practical		To ce optice atom the poor of other te ourses	4	4
	Skill Enhancement Course (SEC -2)		To be opted from the pool of SE courses	4+	2 (4)
	Association and		TOTAL	28	34
SUMA	IER Internship: 15 days	Optional elective	Swayam Swachhta / NSS / Industrial/ others	2	100
_	Core-11	THE FUT OF ADAL	1 541		
	Core -11 Practical	PS/ELEC/C-501L PS/ELEC/C-501P	Microprocessors and Microcontrollers	4	4
V	Core -12	PS/ ELEC /C-502L	Microprocessors and Microcontrollers Lab Electromagnetics	2	1
	Core +12 Practical	PS/ ELEC /C-502L PS/ ELEC /C-502P	Electromagnetics Lab		i
-	Core siz riacheal	Particles ac-302P	Electromagnetics Lab	4	4





Aformin Forward Ro P

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

	Discipline Specific Elective (DSE-1)	PS/ELEC/DSE-501L	DSE-1	4	4
	DSE-1 - Practical	PS/ELEC/DSE-501P	DSE-1 Lab	2	-4
	Discipline Specific Elective - (DSE-2)	PS/ELEC/DSE-502L	DSE-2 .	4	4
	DSE-2 - Practical	PS/ELEC/DSE-502P	DSE-2 Lab	2	14
			TOTAL	24	32
			A CONTRACTOR OF	10.000	
	Core-13	PS/'ELEC /C-601L	Communication Electronics	4	4
vi	Core -13 Practical	PS/ ELEC /C-601P	Communication Electronics Lab	2	4
	Core -14	PS/ELEC/C-602L	Photonics	- 4	:4
	Core -14 Practical	PS/ ELEC /C-602P	Photonics Lab	2	4
	Discipline Specific Elective (DSE-3)	PS/ELEC/DSE-503L	DSE-3	4	4
	DSE-3 - Practical	PS/ELEC/DSE-503P	DSE-3 Lab	2	4
	Discipline Specific Elective (DSE-4) + DSE-4 - Practical Or Dissertation/ Project work followed by seminar	PSÆLEC/PD		4+2=6 Or 5+1=6	8
			TOTAL	24	32
			TOTAL CREDITS	152 + 4	(SD)





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

General electives to be offered by Electronics (for Physics/Maths /Electronics/ Comp. Sc. students) GE/101/ELEC Basic Circuit Theory and Network Analysis / 2 GE/102/ ELEC: Mathematics Foundation for Electronics > GE/201/ ELEC: Semiconductor Devices 🚿 GE/202/ ELEC Applied Physics List of General elective for Electronics Honors: (1st SEM) GE/201/Maths GE/202/Maths GE/201/PHY GE/202/PHY GE/201/COMP. Sc. GE/202/COMP. Sc. Skill Enhancement Courses (02 to 04 papers) (Credit: 02 each)- SEC1 to SEC4 Design and Fabrication of Printed Circuit Boards (4)
Electronics Workshop Skills 3. Electrical circuit network Skills 4. Basic Instrumentation Skills Aforno Tenust for 5. Renewable Energy and Energy harvesting Scold 6. Radiation Safety





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

Electronics Circuits Lab (Hardware and Circuit Simulation Software) 60 Lectures

Objective - To learn the characteristics of FET in common source mode, of half as well as full wave rectifiers, of regulated powersupply, of common Emitter based amplifier, of class A, Class B amplifier and of oscillators such as Colpitt and Hartley.

- 1. Study of the half wave rectifier and Full waverectifier.
- 2. Study of power supply using C filter and Zenerdiode.
- 3. Designing and testing of 5V/9 V DC regulated power supply and find itsload-regulation
- 4. Study of clipping and clamping circuits.
- Study of Fixed Bias, Voltage divider and Collector-to-Base bias Feedback configuration for transistors.
- 6. Designing of a Single Stage CEamplifier.
- 7. Study of Class A, B and C PowerAmplifier.
- 8. Study of the Colpitt'sOscillator.
- 9. Study of the Hartley'sOscillator.
- 10. Study of the Phase ShiftOscillator
- 11. Study of the frequency response of Common Source FETamplifier.

Outcomes – students will be learn basic function of single stage amplifier, multistage amplifier and power Amplifier and their working principle.

शुद्ध एवं अनुप्रयुक्त Dept. of Pure & Applied Physics गुरु घासीदास विश्वविद्यालय Guru Ghasidas I धेलासपुर (छ.ग.)

गरू घासीदास विश्वविद्यालय वम 2009 क 25 के अंतर्गत स्वाधित केन्द्रीय किर्वाविद्यालय) कोनी, बिलासपुर - 495009 (छ.ग.)



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

विभागाध्यक्ष

Guru Ghasidas y

धिलासपुर (छ.ग.)

शुद्ध एवं अनुप्रयुक्त अप्रतिकी विभाग

Dept. of Pure & Applied Physics

गुरु घासीदास विश्वविद्यालय

Digital Electronics and Verilog/VHDL Lab

(Hardware and Circuit Simulation Software)

60 lectures

Objective –

- To learn Hardware Descriptive Language (Verilog/VHDL)
 - To make the student learn and understand the basics of Logic Gates with CMOS such as NAND, NOR gates and flip flop.
 - 1. To verify and design AND, OR, NOT and XOR gates using NAND gates.
 - 2. To convert a Boolean expression into logic gate circuit and assemble it using logic gateIC's.
 - 3. Design a Half and FullAdder.
 - 4. Design a Half and FullSubtractor.
 - 5. Design a seven segment displaydriver.
 - 6. Design a 4 X 1 Multiplexer usinggates.
 - 7. To build a Flip- Flop Circuits using elementary gates. (RS, Clocked RS, D-type).
 - 8. Design a counter using D/T/JKFlip-Flop.
 - 9. Design a shift register and study Serial and parallel shifting ofdata.

Experiments in Verlog/VHDL

- 1. Write code to realize basic and derived logicgates.
- 2. Half adder, Full Adder using basic and derived gates.
- 3. Half subtractor and Full Subtractor using basic and derived gates.
- 4. Clocked D FF, T FF and JKFF (with Resetinputs).
- 5. Multiplexer (4x1, 8x1) and Demultiplexer using logicgates.
- 6. Decoder (2x4, 3x8), Encoders and PriorityEncoders.
- 7. Design and simulation of a 4 bitAdder.
- 8. Code converters (Binary to Gray and viceversa).
- 9. 2 bit Magnitudecomparator.
- 10. 3 bit Ripplecounter.

Outcomes -

- Verifying the concepts of gates, flip flop,adder and subtractor.
- Understanding the logic gate experiments in Verilog/VHDL.

गुरू घासीदास विश्वविद्यालय (क्रीब विवर्वेखाल अधिक 2008 हु 25 के कंग्रंत त्वांगित केन्रीय विवर्वेखाला) कोनी, बिलासपुर - 495009 (छ.ग.)



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

C Programming and Data Structures Lab

60 Lectures

Objective-

- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.
 - 1. Generate the Fibonacci series up to the given limit N and also print the number of elements in the series.
 - 2. Find minimum and maximum of Nnumbers.
 - 3. Find the GCD of two integernumbers.
 - 4. Calculate factorial of a givennumber.
 - 5. Find all the roots of a quadratic equation $Ax^2 + Bx + C = 0$ for non zero coefficients A, B and C. Else reporterror.
 - 6. Calculate the value of sin (x) and cos (x) using the series. Also print sin (x) and cos (x) value using library function.
 - 7. Generate and print prime numbers up to an integerN.
 - 8. Sort given N numbers in ascendingorder.
 - 9. Find the sum & difference of two matrices of order MxN andPxQ.
 - 10. Find the product of two matrices of order MxN andPxQ.
 - 11. Find the transpose of given MxNmatrix.
 - 12. Find the sum of principle and secondary diagonal elements of the given MxNmatrix.
 - 13. Calculate the subject wise and student wise totals and store them as a part of thestructure.
 - 14. Maintain an account of a customer usingclasses.
 - 15. Implement linear and circular linked lists using single and doublepointers.
 - 16. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linkedlist
 - 17. Create circular linked list having information about a college and perform Insertion at front, Deletion atend.
 - 18. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queueelements.
 - 19. Implement polynomial addition and subtraction using linkedlists.
 - 20. Implement sparse matrices using arrays and linkedlists.
 - 21. Create a Binary Tree to perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.
 - 22. Implement binary search tree using linked lists. Compare its time complexity over that of linear search.
 - 23. Implement Insertion sort, Merge sort, Bubble sort, Selectionsort.

Outcomes -

- Develop programs using the basic elements like control statements, Arrays and Strings
- Students will understand basics of numerical analysis such as finding maximum and minimum number, factorial of a number, numbers in ascending order, sum as well as difference of matrices, etc.

गुरू घासीदास विश्वविद्यालय विश्वविद्यालय अधिनियम 2009 छ. 25 के अंतर्गत स्वापित केन्द्रीय विश्वविद्यालय) कोनी, बिलासपुर - 495009 (छ.ग.)



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

Operational Amplifiers and Application Lab (Hardware and Circuit Simulation Software) 60 Lectures

Objective-

- To design and analyse of op-ampamplifiers,
- To study characteristics of multivibratorusing IC555.
 - 1. Study of op-amp characteristics: CMRR and Slewrate.
 - 2. Designing of an amplifier of given gain for an inverting and non-inverting configuration using an opamp.
 - 3. Designing of analog adder and subtractorcircuit.
 - 4. Designing of an integrator using op-amp for a given specification and study its frequency response.
 - 5. Designing of a differentiator using op-amp for a given specification and study its frequency response.
 - 6. Designing of a First Order Low-pass filter usingop-amp.
 - 7. Designing of a First Order High-pass filter usingop-amp.
 - 8. Designing of a RC Phase Shift Oscillator usingop-amp.
 - 9. Study of IC 555 as an astablemultivibrator.
 - 10. Study of IC 555 as monostablemultivibrator.
 - 11. Designing of Fixed voltage power supply using IC regulators using 78 series and 79 series

Outcomes - students will be able to use OP Amp to generate sine waveform, Square wave form, Triangular wave forms.

शुद्ध एवं अनुप्रयुक्त

Guru Ghasidas y

QĎ

अप्रैतिकी विभाग

of Pure & Applied Physics

ishwavid

रू घासीदास विश्वविद्यालय

गुरू घासीदास विश्वविद्यालय व विश्वविद्यालय अधिनियम 2009 छ. 25 के अंतर्गत स्वापित हेन्द्रीय विश्वविद्यालय) कोनी, बिलासपुर - 495009 (छ.ग.)



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

Electronic Instrumentation Lab

60 Lectures

Objective –

- To provide fundamental concepts of control system such as mathematical modelling, time response and frequency response.
- To develop concepts of stability and its assessment criteria.
 - 1. Design of multi range ammeter and voltmeter usinggalvanometer.
 - 2. Measurement of resistance by Wheatstone bridge and measurement of bridgesensitivity.
 - 3. Measurement of Capacitance byde'Sautys.
 - 4. Measure of low resistance by Kelvin's doublebridge.
 - 5. To determine the Characteristics of resistance transducer Strain Gauge (Measurement of Strain using half and fullbridge.)
 - 6. To determine the Characteristics of LVDT.
 - 7. To determine the Characteristics of Thermistors and RTD.
 - 8. Measurement of temperature by Thermocouples and study of transducers like AD590 (two terminal temperature sensor), PT-100, J- type, K-type.
 - 9. To study the Characteristics of LDR, Photodiode, and Phototransistor: (i) VariableIllumination.
 - (ii) LinearDisplacement.
 - 10. Characteristics of one Solid State sensor/ Fiber opticsensor

Outcomes - After successful completion of the course student will be able to

- Students will be able to explain principle of operation for various sensors.
- able describe functional Students will be to blocks

acquisition system. N TETEL शुद्ध एवं अनुप्रयुक्त अतिकी विभाग Dept. of Pure & Applied Physic गुरु घासीदास विश्वविद्यालय Guru Ghasidas Yishwavidya

गुरू घासीदास विश्वविद्यालय (केंद्री किसीबाल अधिम 200 ह. 25 के कंग्रेंग त्वाप्रि केंद्रीय किसीबाल) कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Act 2009 Ma. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

C Programming and Data Structures (Credits: Theory-04, Practicals-02)

Ojective-

- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.

Theory Lectures 60

Unit-1 (12 Lectures): **C Programming Language**: Introduction, Importance of C, Character set, Tokens, keywords identifier, constants, basic data types, variables: declaration & assigning values. Structure of C program Arithmetic operators, relational operators, logical operators, assignment operators, increment and decrement operators, conditional operators, bit wise operators, expressions and evaluation of expressions, type cast operator, implicit conversions, precedence of operators. Arrays-concepts, declaration, accessing elements, storing elements, two-dimensional and multi-dimensional arrays. Input output statement and library functions (math and string related functions).

Unit-2 (19Lectures): **Decision making, branching & looping:** Decision making, branching and looping: if, if-else, else if, switch statement, break, for loop, while loop and do loop. Functions: Defining functions, function arguments and passing, returning values from functions. **Structures:** defining and declaring a structure variables, accessing structure members, initializing a structure, copying and comparing structure variables, array of structures, arrays within structures structures within structures, structures and functions. Pointers. **Introduction to C++:** Object oriented programming characteristics of an object-oriented language.

Unit-3 (15 Lectures): **Data Structures**: Definition of stack, array implementation of stack, conversion of infix expression to prefix, postfix expressions, evaluation of postfix expression. Definition of Queue, Circular queues, Array implementation of queues.Linked List and its implementation.

Unit-4(14 Lectures): Searching and sorting: Insertion sort, selection sort, bubble sort, merge sort, linear Search, binary search Trees :Introduction to trees, Binary search tree, Insertion and searching in a BST. Outcomes - Students will able to select appropriatedata structures as applied to specified problem definition. References:

- 1. YashavantKanetkar, Let Us C, BPBPublications
- 2. Programming in ANSI C, Balagurusamy, 2nd edition, TMH.
- 3. Byron S Gottfried, Programming with C, SchaumSeries
- 4. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language, PrenticeHall

HITTEREL H.OOD शुद्ध एवं अनुप्रयुक्त्म् अप्रिकी विभाग ept. of Pure & Applied Phys गुरु घासीदास विश्वविद्यालय Guru Ghasidas Yishwavidya